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MCQ WORKSHEET-I
CLASS IX : CHAPTER - 2
POLYNOMIALS

1. In $2 + x + x^2$ the coefficient of x^2 is:
(a) 2 (b) 1 (c) – 2 (d) –1

2. In $2 – x^2 + x^3$ the coefficient of x^2 is:
(a) 2 (b) 1 (c) – 2 (d) –1

3. In $\frac{\pi x^2}{2} + x + 10$, the coefficient of x^2 is:
(a) $\frac{\pi}{2}$ (b) 1 (c) $-\frac{\pi}{2}$ (d) –1

4. The degree of $5t – 7$ is:
1. 0 (b) 1 (c) 2 (d) 3

5. The degree of $4 – y^2$ is:
(a) 0 (b) 1 (c) 2 (d) 3

6. The degree of 3 is:
(a) 0 (b) 1 (c) 2 (d) 3

7. The value of $p(x) = 5x – 4x^2 + 3$ for $x = 0$ is:
(a) 3 (b) 2 (c) – 3 (d) – 2

8. The value of $p(x) = 5x – 4x^2 + 3$ for $x = – 1$ is:
(a) 6 (b) –6 (c) 3 (d) – 3

9. The value of $p(x) = (x – 1)(x + 1)$ for $p(1)$ is:
(a) 1 (b) 0 (c) 2 (d) – 2

10. The value of $p(t) = 2 + t + 2t^2 – t^3$ for $p(0)$ is:
(a) 1 (b) 2 (c) – 1 (d) 3

11. The value of $p(t) = 2 + t + 2t^2 – t^3$ for $p(2)$ is:
(a) 4 (b) –4 (c) 6 (d) 7

12. The value of $p(y) = y^2 – y + 1$ for $p(0)$ is:
(a) –1 (b) 3 (c) –2 (d) 1

MCQ WORKSHEET-ii
CLASS IX : CHAPTER - 2
POLYNOMIALS

1. The zero of p(x) = 2x – 7 is:
(a) $\frac{7}{2}$ (b) $\frac{2}{7}$ (c) $\frac{-2}{7}$ (d) $\frac{-7}{2}$

2. The zero of p(x) = 9x + 4 is:
(a) $\frac{4}{9}$ (b) $\frac{9}{4}$ (c) $\frac{-4}{9}$ (d) $\frac{-9}{4}$

3. Which are the zeroes of p(x) = x^2 – 1:
(a) 1, –1 (b) – 1, 2 (c) –2, 2 (d) –3, 3

4. Which are the zeroes of p(x) = (x – 1)(x – 2):
(a) 1, –2 (b) – 1, 2 (c) 1, 2 (d) –1, –2

5. Which one of the following is the zero of p(x) = lx + m
(a) $\frac{m}{l}$ (b) $\frac{l}{m}$ (c) $-\frac{m}{l}$ (d) $-\frac{l}{m}$

6. Which one of the following is the zero of p(x) = $5x-\pi$:
(a) $-\frac{4}{5}\pi$ (b) $\frac{1}{5}\pi$ (c) $\frac{4}{5}\pi$ (d) none of these

7. On dividing $x^3 + 3x^2 + 3x + 1$ by x we get remainder:
(a) 1 (b) 0 (c) – 1 (d) 2

8. On dividing $x^3 + 3x^2 + 3x + 1$ by $x+\pi$ we get remainder:
$(a)-\pi^3+3\pi^2-3\pi+1$
$(b)\pi^3-3\pi^2+3\pi+1$
$(c)-\pi^3-3\pi^2-3\pi-1$
$(d)-\pi^3+3\pi^2-3\pi-1$

9. On dividing $x^3 + 3x^2 + 3x + 1$ by 5 + 2x we get remainder:
(a) $\frac{8}{27}$ (b) $\frac{27}{8}$ (c) $-\frac{27}{8}$ (d) $-\frac{8}{27}$

10. If x – 2 is a factor of x^3 – 3x +5a then the value of a is:
(a) 1 (b) –1 (c) $\frac{2}{5}$ (d) $\frac{-2}{5}$

MCQ WORKSHEET-III
CLASS IX : CHAPTER - 2
POLYNOMIALS

1. $(x + 8)(x – 10)$ in the expanded form is:
(a) $x^2 – 8x – 80$ (b) $x^2 – 2x – 80$ (c) $x^2 + 2x + 80$ (d) $x^2 – 2x + 80$

2. The value of 95 x 96 is:
(a) 9020 (b) 9120 (c) 9320 (d) 9340

3. The value of 104 x 96 is:
(a) 9984 (b) 9624 (c) 9980 (d) 9986

4. Without actual calculating the cubes the value of $28^3 + (–15)^3 + (–13)^3$ is:
(a) 16380 (b) –16380 (c) 15380 (d) –15380

5. If $x – 2$ is a factor of $x^3 – 2ax^2 + ax – 1$ then the value of a is:
(a) $\frac{7}{6}$ (b) $\frac{-7}{6}$ (c) $\frac{6}{7}$ (d) $\frac{-6}{7}$

6. If $x + 2$ is a factor of $x^3 + 2ax^2 + ax – 1$ then the value of a is:
(a) $\frac{2}{3}$ (b) $\frac{3}{5}$ (c) $\frac{3}{2}$ (d) $\frac{1}{2}$

7. If $x + y + z = 0$ then $x^3 + y^3 + z^3$ is equal to
(a) 3xyz (b) – 3xyz (c) xy (d) –2xy

8. The factors of $2x^2 – 7x + 3$ are:
(a) $(x – 3)(2x – 1)$ (b) $(x + 3)(2x + 1)$
(c) $(x – 3)(2x + 1)$ (d) $(x + 3)(2x – 1)$

9. The factors of $6x^2 + 5x – 6$ are:
(a) $(2x – 3)(3x – 2)$ (b) $(2x – 3)(3x + 2)$
(c) $(2x + 3)(3x – 2)$ (d) $(2x + 3)(3x + 2)$

10. The factors of $3x^2 – x – 4$ are:
(a) $(3x – 4)(x – 1)$ (b) $(3x – 4)(x + 1)$
(c) $(3x + 4)(x – 1)$ (d) $(3x + 4)(x + 1)$

11. The factors of $12x^2 – 7x + 1$ are:
(a) $(4x – 1)(3x – 1)$ (b) $(4x – 1)(3x + 1)$
(c) $(4x + 1)(3x – 1)$ (d) $(4x + 1)(3x + 1)$

12. The factors of $x^3 – 2x^2 – x + 2$ are:
(a) $(x – 1)(x – 1)(x – 5)$ (b) $(x + 1)(x + 1)(x + 5)$
(c) $(x + 1)(x – 1)(x + 5)$ (d) $(x + 1)(x + 1)(x – 5)$

MCQ WORKSHEET-Iv
CLASS IX : CHAPTER - 2
POLYNOMIALS

1. Which of the following is not a polynomial?
(a) $x^2+\sqrt{2}x+3$ (b) $x^2+\sqrt{2x}+6$ (c) x^3+3x^2-3 (d) $6x+4$

2. The degree of the polynomial $3x^3 - x^4 + 5x + 3$ is
(a) –4 (b) 4 (c) 1 (d) 3

3. Zero of the polynomial $p(x) = a^2x$, $a \neq 0$ is
(a) x = 0 (b) x = 1 (c) x = –1 (d) a = 0

4. Which of the following is a term of a polynomial?
(a) 2x (b) $\frac{3}{x}$ (c) $x^{\sqrt{x}}$ (d) $\sqrt{x}$

5. If $p(x) = 5x^2 - 3x + 7$, then p(1) equals
(a) –10 (b) 9 (c) –9 (d) 10

6. Factorisation of $x^3 + 1$ is
(a) $(x + 1)(x^2 – x + 1)$ (b) $(x + 1)(x^2 + x + 1)$
(c) $(x + 1)(x^2 – x – 1)$ (d) $(x + 1)(x^2 + 1)$

7. If x + y + 2 = 0, then $x^3 + y^3 + 8$ equals
(a) $(x + y + 2)^3$ (b) 0 (c) 6xy (d) –6xy

8. If x = 2 is a zero of the polynomial $2x^2 + 3x – p$, then the value of p is
(a) –4 (b) 0 (c) 8 (d) 14

9. $x+\frac{1}{x}$ is
(a) a polynomial of degree 1 (b) a polynomial of degree 2
(c) a polynomial of degree 3 (d) not a polynomial

10. Integral zeroes of the polynomial (x + 3)(x – 7) are
(a) –3, –7 (b) 3, 7 (c) –3, 7 (d) 3, –7

11. The remainder when $p(x) = 2x^2 – x – 6$ is divided by (x – 2) is
(a) p(– 2) (b) p(2) (c) p(3) (d) p(–3)

12. If $2\left(a^2+b^2\right)=\left(a+b\right)^2$, then
(a) a + b = 0 (b) a = b (c) 2a = b (d) ab = 0

13. If $x^3 + 3x^2 + 3x + 1$ is divided by (x + 1), then the remainder is
(a) –8 (b) 0 (c) 8 (d) $\frac{1}{8}$

14. The value of $(525)^2 – (475)^2$ is
(a) 100 (b) 1000 (c) 100000 (d) –100

15. If a + b = –1, then the value of $a^3 + b^3 - 3ab$ is

(a) –1 (b) 1 (c) 26 (d) –26

16. The value of $(2-a)^3 + (2-b)^3 + (2-c)^3 - 3(2-a)(2-b)(2-c)$ when a + b + c = 6 is

(a) –3 (b) 3 (c) 0 (d) –1

17. If $\frac{a}{b} + \frac{b}{a} = 1, (a \neq 0, b \neq 0)$, then the value of $a^3 - b^3$ is

(a) –1 (b) 0 (c) 1 (d) $\frac{1}{2}$

18. If $x = \frac{1}{2-\sqrt{3}}$, then the value of $(x^2 - 4x + 1)$ is

(a) –1 (b) 0 (c) 1 (d) 3

19. The number of zeroes of the polynomial $x^3 + x - 3 - 3x^2$ is

(a) 1 (b) 2 (c) 0 (d) 3

20. If (x + 2) and (x – 2) are factors of $ax^4 + 2x - 3x^2 + bx - 4$, then the value of a + b is

(a) –7 (b) 7 (c) 14 (d) –8

PRACTICE QUESTIONS
CLASS IX : CHAPTER - 2
POLYNOMIALS

1. Factorize the following: $9x^2 + 6x + 1 - 25y^2$.

2. Factorize the following: $a^2 + b^2 + 2ab + 2bc + 2ca$

3. Show that $p(x) = x^3 - 3x^2 + 2x - 6$ has only one real zero.

4. Find the value of a if $x + 6$ is a factor of $x^3 + 3x^2 + 4x + a$.

5. If polynomials $ax^3 + 3x^2 - 3$ and $2x^3 - 5x + a$ leaves the same remainder when each is divided by $x - 4$, find the value of a..

6. The polynomial $f(x)= x^4 - 2x^3 + 3x^2 - ax + b$ when divided by $(x - 1)$ and $(x + 1)$ leaves the remainders 5 and 19 respectively. Find the values of a and b. Hence, find the remainder when f(x) is divided by $(x - 2)$.

7. If the polynomials $2x^3 + ax^2 + 3x - 5$ and $x^3 + x^2 - 2x + a$ leave the same remainder when divided by $(x - 2)$, find the value of a. Also, find the remainder in each case.

8. If the polynomials $az^3 + 4z^2 + 3z - 4$ and $z^3 - 4z + a$ leave the same remainder when divided by $z - 3$, find the value of a.

9. The polynomial $p(x) = x^4 - 2x^3 + 3x^2 - ax + 3a - 7$ when divided by $x + 1$ leaves the remainder 19. Find the values of a. Also find the remainder when $p(x)$ is divided by $x + 2$.

10. If both $x - 2$ and $x - \frac{1}{2}$ are factors of $px^2 + 5x + r$, show that $p = r$.

11. Without actual division, prove that $2x^4 - 5x^3 + 2x^2 - x + 2$ is divisible by $x^2 - 3x + 2$.

12. Simplify $(2x - 5y)^3 - (2x + 5y)^3$.

13. Multiply $x^2 + 4y^2 + z^2 + 2xy + xz - 2yz$ by $(- z + x - 2y)$.

14. If a, b, c are all non-zero and $a + b + c = 0$, prove that $\frac{a^2}{bc} + \frac{b^2}{ca} + \frac{c^2}{ab} = 3$

15. If $a + b + c = 5$ and $ab + bc + ca = 10$, then prove that $a^3 + b^3 + c^3 - 3abc = - 25$.

16. Without actual division, prove that $2x^4 - 6x^3 + 3x^2 + 3x - 2$ is exactly divisible by $x^2 - 3x + 2$.

17. Without actual division, prove that $x^3 - 3x^2 - 13x + 15$ is exactly divisible by $x^2 + 2x - 3$.

18. Find the values of a and b so that the polynomial $x^3 - 10x^2 + ax + b$ is exactly divisible by $(x - 1)$ as well as $(x - 2)$.

19. Find the integral zeroes of the polynomial $2x^3 + 5x^2 - 5x - 2$.

20. If $(x - 3)$ and $\left(x - \frac{1}{3}\right)$ are both factors of $ax^2 + 5x + b$, then show that $a = b$.

21. Find the values of a and b so that the polynomial $x^4 + ax^3 - 7x^2 + 8x + b$ is exactly divisible by $(x + 2)$ as well as $(x + 3)$.

22. If $x^3 + ax^2 + bx + 6$ has $(x - 2)$ as a factor and leaves a remainder 3 when divided by $(x - 3)$, find the values of a and b.

23. Find the value of $x^3 + y^3 + 15xy - 125$ if $x + y = 5$.

24. Without actually calculating, find the value of $(25)^3 - (75)^3 + (50)^3$.

25. Factorise each of the following cubic expressions:

(i) $8x^3 - y^3 - 12x^2y + 6xy^2$

(ii) $27q^3 - 125p^3 - 135q^2p + 225qp^2$

(iii) $8x^3 + 729 + 108x^2 + 486x$

(iv) $27x^3 - \frac{1}{216} - \frac{9}{2}x^2 + \frac{1}{4}x$

26. Factorise:

(i) $x^3 + 216y^3 + 8z^3 - 36xyz$

(ii) $a^3 - 64b^3 - 27c^3 - 36abc$

27. Factorise: $\left(\frac{1}{2}x - 3y\right)^3 + \left(3y - \sqrt{3}z\right)^3 + \left(\sqrt{3}z - \frac{1}{2}x\right)^3$

28. Give one example each of a binomial of degree 35, and of a monomial of degree 100.

29. Find a zero of the polynomial $p(x) = 2x + 1$.

30. Verify whether 2 and 0 are zeroes of the polynomial $x^2 - 2x$.

31. Find the zero of the polynomial in each of the following cases:

(i) $p(x) = x + 5$ (ii) $p(x) = x - 5$ (iii) $p(x) = 2x + 5$

(iv) $p(x) = 3x - 2$ (v) $p(x) = 3x$ (vi) $p(x) = ax$, $a \neq 0$

32. Find the value of each of the following polynomials at the indicated value of variables:

(i) $p(x) = 5x^2 - 3x + 7$ at $x = 1$.

(ii) $q(y) = 3y^3 - 4y + \sqrt{11}$ at $y = 2$.

(iii) $p(t) = 4t^4 + 5t^3 - t^2 + 6$ at $t = a$.

33. Divide $p(x)$ by $g(x)$, where $p(x) = x + 3x^2 - 1$ and $g(x) = 1 + x$.

34. Divide the polynomial $3x^4 - 4x^3 - 3x - 1$ by $x - 1$.

35. Find the remainder obtained on dividing $p(x) = x^3 + 1$ by $x + 1$.

36. Find the remainder when $x^4 + x^3 - 2x^2 + x + 1$ is divided by $x - 1$.

37. Check whether the polynomial $q(t) = 4t^3 + 4t^2 - t - 1$ is a multiple of $2t + 1$.

38. Check whether p(x) is a multiple of g(x) or not, where $p(x) = x^3 - x + 1$, $g(x) = 2 - 3x$.

39. Check whether g(x) is a factor of p(x) or not, where $p(x) = 8x^3 - 6x^2 - 4x + 3$, $g(x) = \frac{x}{3} - \frac{1}{4}$.

40. Find the remainder when $x^3 - ax^2 + 6x - a$ is divided by $x - a$.

41. Examine whether $x + 2$ is a factor of $x^3 + 3x^2 + 5x + 6$ and of $2x + 4$.

42. Find the value of k, if $x - 1$ is a factor of $4x^3 + 3x^2 - 4x + k$.

43. Find the value of a, if $x - a$ is a factor of $x^3 - ax^2 + 2x + a - 1$.

44. Factorise $6x^2 + 17x + 5$

45. Factorise $y^2 - 5y + 6$

46. Factorise $x^3 - 23x^2 + 142x - 120$.

47. Factorise :
(i) $x^3 - 2x^2 - x + 2$ (ii) $x^3 - 3x^2 - 9x - 5$
(iii) $x^3 + 13x^2 + 32x + 20$ (iv) $2y^3 + y^2 - 2y - 1$

48. Factorise : $4x^2 + 9y^2 + 16z^2 + 12xy - 24yz - 16xz$

49. Expand $(4a - 2b - 3c)^2$.

50. Factorise $4x^2 + y^2 + z^2 - 4xy - 2yz + 4xz$.

51. If $x + 1$ is a factor of $ax3 + x2 - 2x + 4a - 9$, find the value of a.

52. By actual division, find the quotient and the remainder when the first polynomial is divided by the second polynomial : $x^4 + 1$; $x - 1$

53. Find the zeroes of the polynomial : $p(x) = (x - 2)^2 - (x + 2)^2$

54. Factorise :
(i) $x^2 + 9x + 18$ (ii) $6x^2 + 7x - 3$
(iii) $2x^2 - 7x - 15$ (iv) $84 - 2r - 2r^2$

55. Factorise :
(i) $2x^3 - 3x^2 - 17x + 30$ (ii) $x^3 - 6x^2 + 11x - 6$
(iii) $x^3 + x^2 - 4x - 4$ (iv) $3x^3 - x^2 - 3x + 1$

56. Using suitable identity, evaluate the following:
(i) 103^3 (ii) 101×102 (iii) 999^2

57. Factorise the following:
(i) $4x^2 + 20x + 25$
(ii) $9y^2 - 66yz + 121z^2$
(iii) $\left(2x + \frac{1}{3}\right)^2 - \left(x - \frac{1}{2}\right)^2$

58. Factorise the following :
(i) $9x^2 - 12x + 3$ (ii) $9x^2 - 12x + 4$

59. If $a + b + c = 9$ and $ab + bc + ca = 26$, find $a^2 + b^2 + c^2$.

60. Expand the following :
(i) $(4a - b + 2c)^2$
(ii) $(3a - 5b - c)^2$

(iii) $(-x + 2y - 3z)^2$

61. Find the value of
(i) $x^3 + y^3 - 12xy + 64$, when $x + y = -4$
(ii) $x^3 - 8y^3 - 36xy - 216$, when $x = 2y + 6$

62. Factorise the following :
(i) $9x^2 + 4y^2 + 16z^2 + 12xy - 16yz - 24xz$
(ii) $25x^2 + 16y^2 + 4z^2 - 40xy + 16yz - 20xz$
(iii) $16x^2 + 4y^2 + 9z^2 - 16xy - 12yz + 24\,xz$

63. Expand the following :
(i) $(3a - 2b)^3$ (ii) $\left(\frac{1}{x} + \frac{y}{3}\right)^3$ (iii) $\left(4 - \frac{1}{3x}\right)^3$

64. Find the following products:
(i) $\left(\frac{x}{2} + 2y\right)\left(\frac{x^2}{4} - xy + 4y^2\right)$ (ii) $(x^2 - 1)(x^4 + x^2 + 1)$

65. Factorise the following :
(i) $8p^3 + \frac{12}{5}p^2 + \frac{6}{25}p + \frac{1}{125}$
(ii) $1 - 64a^3 - 12a + 48a^2$

66. Without finding the cubes, factorise $(x - 2y)^3 + (2y - 3z)^3 + (3z - x)^3$

67. Give possible expressions for the length and breadth of the rectangle whose area is given by $4a^2 + 4a - 3$.

68. Factorise: (i) $1 + 64x^3$ (ii) $a^3 - 2\sqrt{2}b^3$

69. Evaluate each of the following using suitable identities:
(i) $(104)^3$ (ii) $(999)^3$

70. Factorise : $8x^3 + 27y^3 + 36x^2y + 54xy^2$

71. Factorise : $8x^3 + y^3 + 27z^3 - 18xyz$

72. Verify : (i) $x^3 + y^3 = (x + y)(x^2 - xy + y^2)$ (ii) $x^3 - y^3 = (x - y)(x^2 + xy + y^2)$

73. Factorise each of the following:
(i) $27y^3 + 125z^3$ (ii) $64m^3 - 343n^3$

74. Factorise : $27x^3 + y^3 + z^3 - 9xyz$

75. Without actually calculating the cubes, find the value of each of the following:
(i) $(-12)^3 + (7)^3 + (5)^3$
(ii) $(28)^3 + (-15)^3 + (-13)^3$

76. Find the following product :$(2x - y + 3z)(4x^2 + y^2 + 9z^2 + 2xy + 3yz - 6xz)$

77. Factorise :
(i) $a^3 - 8b^3 - 64c^3 - 24abc$ (ii) $2\sqrt{2}\,a^3 + 8b^3 - 27c^3 + 18\,\sqrt{2}\,abc$.

78. Give possible expressions for the length and breadth of rectangles, in which its area is given by $35y^2 + 13y - 12$

79. Without actually calculating the cubes, find the value of :

$(i)\left(\frac{1}{2}\right)^3 + \left(\frac{1}{3}\right)^3 - \left(\frac{5}{6}\right)^3$ $\qquad$ $(ii)\left(0.2\right)^3 - \left(0.3\right)^3 + \left(0.1\right)^3$

80. By Remainder Theorem find the remainder, when $p(x)$ is divided by $g(x)$, where

(i) $p(x) = x^3 - 2x^2 - 4x - 1$, $g(x) = x + 1$

(ii) $p(x) = x^3 - 3x^2 + 4x + 50$, $g(x) = x - 3$

(iii) $p(x) = 4x^3 - 12x^2 + 14x - 3$, $g(x) = 2x - 1$

(iv) $p(x) = x^3 - 6x^2 + 2x - 4$, $g(x) = 1 - \frac{3}{2}x$

81. Check whether $p(x)$ is a multiple of $g(x)$ or not :

(i) $p(x) = x^3 - 5x^2 + 4x - 3$, $g(x) = x - 2$

(ii) $p(x) = 2x^3 - 11x^2 - 4x + 5$, $g(x) = 2x + 1$

82. Show that $p - 1$ is a factor of $p^{10} - 1$ and also of $p^{11} - 1$.

83. For what value of m is $x^3 - 2mx^2 + 16$ divisible by $x + 2$?

84. If $x + 2a$ is a factor of $x^5 - 4a^2x^3 + 2x + 2a + 3$, find a.

85. Find the value of m so that $2x - 1$ be a factor of $8x^4 + 4x^3 - 16x^2 + 10x + m$.

86. Show that :

(i) $x + 3$ is a factor of $69 + 11x - x^2 + x^3$.

(ii) $2x - 3$ is a factor of $x + 2x^3 - 9x^2 + 12$.

87. If $x + y = 12$ and $xy = 27$, find the value of $x^3 + y^3$.

88. Without actually calculating the cubes, find the value of $48^3 - 30^3 - 18^3$.

89. Without finding the cubes, factorise $(2x - 5y)^3 + (5y - 3z)^3 + (3z - 2x)^3$.

90. Without finding the cubes, factorise $(x - y)^3 + (y - z)^3 + (z - x)^3$.

MCQ WORKSHEET-I
CLASS IX: CHAPTER – 8
QUADRILATERALS

1. The bisectors of angles of a parallelogram form a :
(a) trapezium (b) rectangle (c) rhombus (d) kite

2. The angles of a quadrilaterals are in the ratio 3 : 4 : 5 : 6. The respective angles of the quadrilaterals are
(a) 60^0, 80^0, 100^0, 120^0 (b) 120^0, 100^0, 80^0, 60^0
(c) 120^0, 60^0, 80^0, 100^0 (d) 80^0, 100^0, 120^0, 60^0.

3. If diagonals of a quadrilateral are equal and bisect each other at right angles, then it is a:
(a) parallelogram (b) square (c) rhombus (d) trapezium

4. If in rectangle ABCD, diagonal AC bisects $\angle A$ as well $\angle C$, then ABCD is a:
(a) parallelogram (b) square (c) rhombus (d) trapezium

5. The line segment joining the midpoints of two sides of a triangle is parallel to the third side and _____ of it.
(a) half (b) one third (c) one fourth (d) equal

6. Line segment joining the mid points of the opposite sides of a quadrilateral _____ each other.
(a) trisect (b) bisect (c) coincide (d) none of these.

7. Three angles of a quadrilateral are 75^0, 90^0 and 75^0. The fourth angle is
(a) 90^0 (b) 95^0 (c) 105^0 (d) 120^0

8. A diagonal of a rectangle is inclined to one side of the rectangle at 25^0. The acute angle between the diagonals is
(a) 55^0 (b) 50^0 (c) 40^0 (d) 25^0

9. ABCD is a rhombus such that $\angle ACB = 40^0$, then $\angle ADB =$
(a) 45^0 (b) 50^0 (c) 40^0 (d) 60^0

10. The quadrilateral formed by joining the midpoints of the sides of a quadrilateral PQRS, taken in order, is a rectangle, if
(a) PQRS is a rectangle (b) PQRS is an parallelogram
(c) diagonals of PQRS are perpendicular (d) diagonals of PQRS are equal.

11. The quadrilateral formed by joining the midpoints of the sides of a quadrilateral PQRS, taken in order, is a rhombus, if
(a) PQRS is a rhombus (b) PQRS is an parallelogram
(c) diagonals of PQRS are perpendicular (d) diagonals of PQRS are equal.

12. If angles A, B, C and D of the quadrilateral ABCD, taken in order are in the ratio 3:7:6:4, then ABCD is a
(a) parallelogram (b) kite (c) rhombus (d) trapezium

MCQ WORKSHEET-II
CLASS IX: CHAPTER – 8
QUADRILATERALS

1. If bisectors of $\angle A$ and $\angle B$ of a quadrilateral ABCD intersect each other at P, of $\angle B$ and $\angle C$ at Q, of $\angle C$ and $\angle D$ at R and of $\angle D$ and $\angle A$ at S, then PQRS is a
(a) parallelogram (b) rectangle (c) rhombus
(d) quadrilateral whose opposite angles are supplementary.

2. If APB and CQD are two parallel lines then bisectors of the angles APQ. BPQ, CQP and PQD form a
(a) parallelogram (b) square (c) rhombus (d) rectangle

3. The figure obtained the midpoints of the sides of the sides of a rhombus, taken in order is a
(a) parallelogram (b) square (c) rhombus (d) rectangle

4. D and E are the midpoints of the sides AB and AC of ΔABC and O is any point on side BC. O is joined to A. If P and Q are the midpoints of OB and OC respectively, then DEQP is a
(a) parallelogram (b) square (c) rhombus (d) rectangle

5. The quadrilateral formed by joining the midpoints of the sides of a quadrilateral PQRS, taken in order, is a square only if
(a) PQRS is a rhombus (b) diagonals of PQRS are equal and perpendicular
(c) diagonals of PQRS are perpendicular (d) diagonals of PQRS are equal.

6. The diagonals AC and BD of a parallelogram ABCD intersect each other at the point O. If $\angle DAC = 32^0$ and $\angle AOB = 70^0$, then $\angle DBC$ is equal to
(a) 24^0 (b) 86^0 (c) 38^0 (d) 32^0

7. Which of the following is not true for a parallelogram?
(a) opposite sides are equal (b) opposite angles are bisected by the diagonals
(c) opposite angles are equal (d) diagonals bisect each other.

8. D and E are the midpoints of the sides AB and AC of ΔABC. DE is produced to F. To prove that CF is equal and parallel to DA, we need an additional information which is
(a) $\angle DAE = \angle EFC$ (b) AE = EF (c) DE = EF (d) $\angle ADE = \angle ECF$

9. The bisectors of any two adjacent angles of a parallelogram intersect at
(a) 45^0 (b) 30^0 (c) 90^0 (d) 60^0

10. The bisectors of the angles of a parallelogram enclose a
(a) parallelogram (b) square (c) rhombus (d) rectangle

11. ABCD is a parallelogram and E and F are the centroid of triangle ABD and BCD respectively, then EF =
(a) AE (b) BE (c) CE (d) DE

12. ABCD is a parallelogram, M is the midpoint of BD and BM bisects $\angle B$, then $\angle AMB$ =
(a) 45^0 (b) 75^0 (c) 90^0 (d) 60^0

MCQ WORKSHEET-III
CLASS IX: CHAPTER – 8
QUADRILATERALS

1. Given four points A, B, C, D such that three points A, B, C are collinear. By joining these points in order, we get
(a) a straight line (b) a triangle (c) quadrilateral (d) none of these

2. In quadrilateral ABCD, AB = BC and CD = DA, then the quadrilateral is a
(a) parallelogram (b) rhombus (c) kite (d) trapezium

3. Given a triangular prism, then what can we conclude about the lateral faces.
(a)faces are rectangular (b) faces are parallelogram
(c) faces are trapeziums (d) square

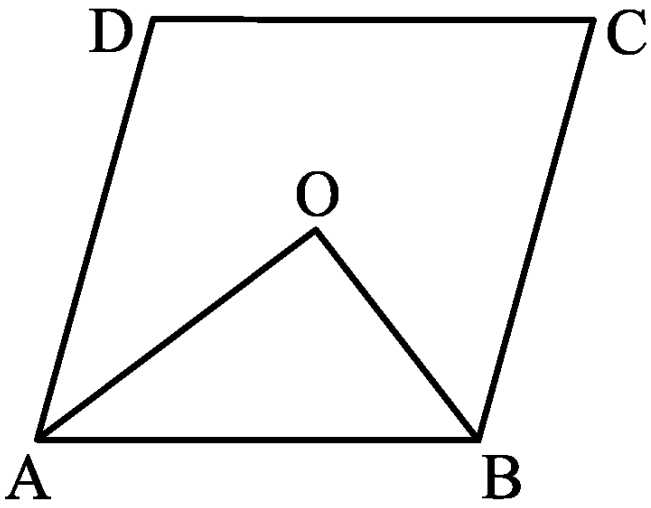
4. The bisectors of the angles of parallelogram enclose a
(a) parallelogram (b) rhombus (c) rectangle (d) square

5. Which if the following quadrilateral a rhombus?
(a) diagonals bisect each other (b) all the four sides are equal
(c) diagonals bisect opposite angles (d) one angle between the diagonals is 60^0.

6. Consecutive angles of parallelogram are
(a) equal (b) supplementary (c) complementary (d) none of these

7. Given a rectangle ABCD and P, Q, R, S midpoints of AB, BC, CD and DA respectively. Length of diagonal of rectangle is 8 cm, the quadrilateral PQRS is
(a) parallelogram with adjacent sides 4 cm (b) rectangle with adjacent sides 4 cm
(c) rhombus with side 4 cm (d) square with side 4 cm

8. In parallelogram ABCD, bisectors of angles and B intersect each other at O. The value of AOB is:
(a) 30^0 (b) 60^0 (c) 90^0 (d) 120^0



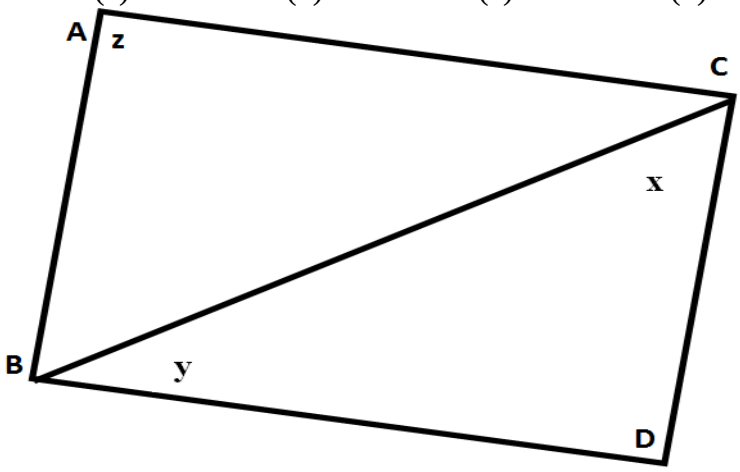
9. If an angle of a parallelogram is two-third of its adjacent angle, the smallest angle of the parallelogram is
(a) 108^0 (b) 54^0 (c) 72^0 (d) 81^0

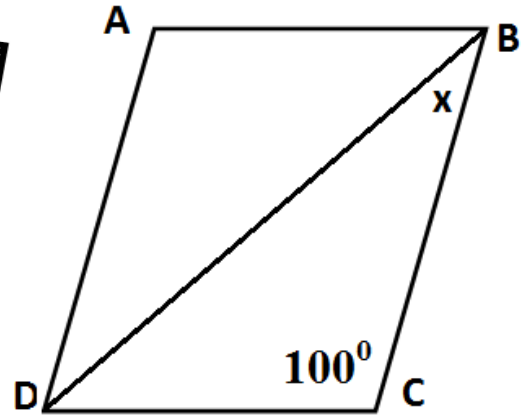
10. If the degree measures of the angles of quadrilateral are 4x, 7x, 9x and [illegible], what is the sum of the measures of the smallest angle and largest angle?

(a) 140^0 (b) 150^0 (c) 168^0 (d) 180^0

11. In the given figure ABCD is a parallelogram, what is the sum of the angle x, y and z?

(a) 140^0 (b) 150^0 (c) 168^0 (d) 180^0



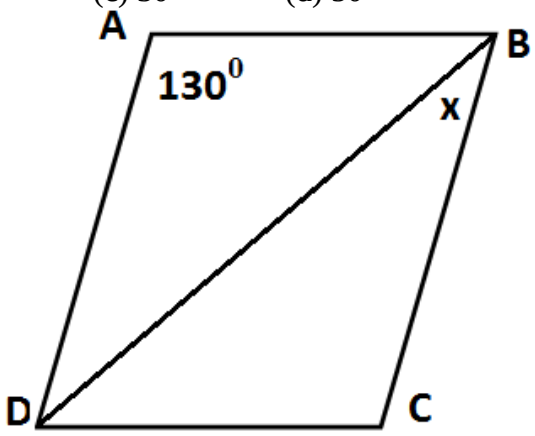


12. In the above figure ABCD is a rhombus, then the value of x is

(a) 40^0 (b) 50^0 (c) 60^0 (d) 80^0

13. In the below figure ABCD is a rhombus, then the value of x is

(a) 20^0 (b) 25^0 (c) 30^0 (d) 50^0



14. ABCD is a parallelogram and AB = 12cm, AD = 8 cm then perimeter of parallelogram ABCD is

(a) 20 cm (b) 40 cm (c) 60 cm (d) 80 cm

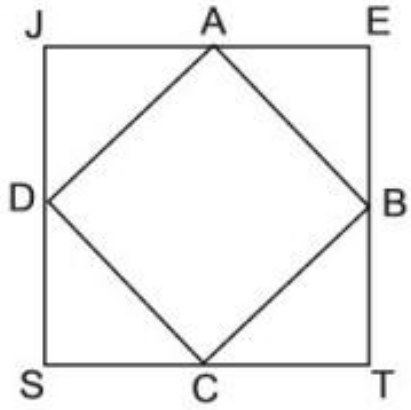
15. In parallelogram *CARS*, $m\angle C = 5x - 20$ and $m\angle A = 3x + 40$. Find the value of *x*.

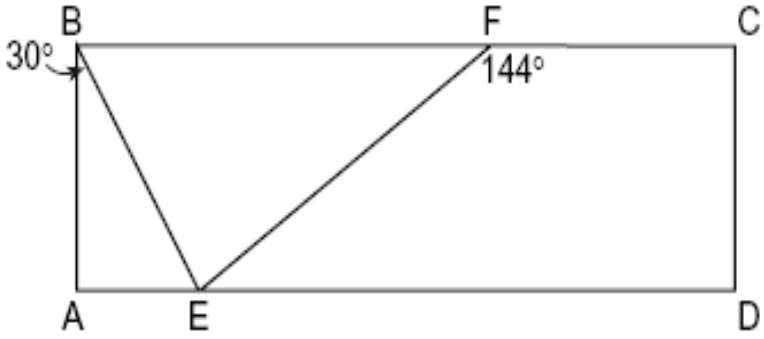
(a) 15 (b) 20 (c) 30 (d) 130

MCQ WORKSHEET-IV
CLASS IX: CHAPTER – 8
QUADRILATERALS

1. If two consecutive sides of a rhombus are represented by $3x - 6$ and $x + 14$, then the perimeter of the rhombus is
(a) 10 (b) 24 (c) 70 (d) 96

2. Points *A*, *B*, *C*, and *D* are midpoints of the sides of square *JETS*. If the area of *JETS* is 36, the area of *ABCD* is
(a) $9\sqrt{2}$ (b) $18\sqrt{2}$ (c) 9 (d) 18





3. In the accompanying above diagram of rectangle *ABCD*, $m\angle ABE = 30$ and $m\angle CFE = 144$. Find $m\angle BEF$.
(a) 36° (b) 60° (c) 84° (d) 90°

4. A quadrilateral must be a parallelogram if one pair of opposite sides is
(a) congruent, only. (b) parallel and the other pair of opposite sides is congruent.
(c) congruent and parallel. (d) parallel only

5. The perimeter of a rhombus is 60. If the length of its longer diagonal measures 24, the length of the shorter diagonal is
(a) 20 (b) 18 (c) 15 (d) 9

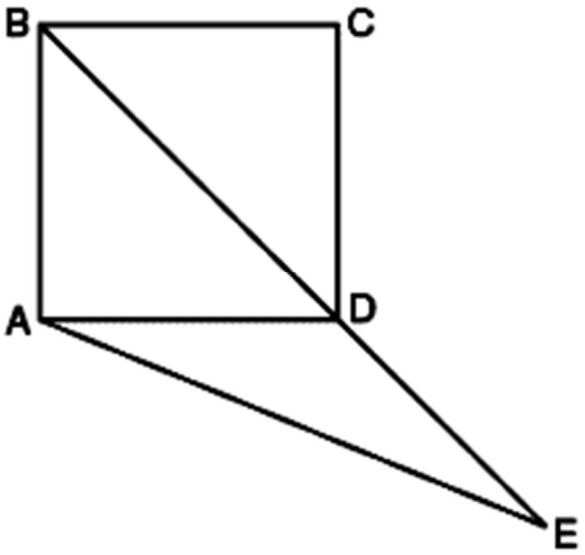
6. Find the perimeter of a rhombus whose diagonals measure 12 and 16.
(a) 10 (b) 20 (c) 40 (d) 80

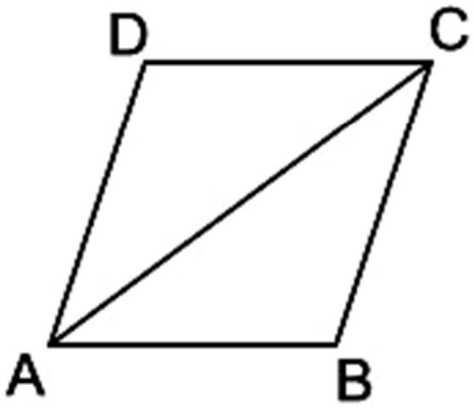
7. Which statement is true about all parallelograms?
(a) The diagonals are congruent.
(b) The area is the product of two adjacent sides.
(c) The opposite angles are congruent.
(d) The diagonals are perpendicular to each other.

8. Which property is true for all trapezoids?
(a) Only two opposite sides are parallel.
(b) Consecutive angles are supplementary.
(c) The base angles are congruent.
(d) All angles are equal.

9. In the diagram at the right, *ABCD* is a square, diagonal BD is extended through D to E. AD = DE and AE is drawn as given in figure. What is $m\angle DAE$?

(a) 22.5 (b) 45.0 (c) 112.5 (d) 135.0





10. In the above right sided diagram of rhombus *ABCD*, $m\angle CAB = 35^0$. Find $m\angle CDA$.

(a) 35° (b) 70° (c) 110° (d) 140°

11. In rectangle *DATE*, diagonals DT and AE intersect at *S*. If *AE* = 40 and *ST* = *x* + 5, find the value of *x*.

(a) 10 (b) 18 (c) 15 (d) 20

12. A parallelogram must be a rectangle if its diagonals

(a) bisect each other.
(b) bisect the angles to which they are drawn.
(c) are perpendicular to each other.
(d) are congruent.

MCQ WORKSHEET-V
CLASS IX: CHAPTER – 8
QUADRILATERALS

1. Three angles of a quadrilateral are 75^0 , 90^0 and 75^0. The fourth angle is
(A) 90^0 (B) 95^0 (C) 105^0 (D) 120^0

2. A diagonal of a rectangle is inclined to one side of the rectangle at 25ϟ. The acute angle between the diagonals is
(A) 55^0 (B) 50^0 (C) 40^0 (D) 25^0

3. ABCD is a rhombus such that $\angle ACB = 40^0$. Then $\angle ADB$ is
(A) 40^0 (B) 45^0 (C) 50^0 (D) 60^0

4. The quadrilateral formed by joining the mid-points of the sides of a quadrilateral PQRS, taken in order, is a rectangle, if
(A) PQRS is a rectangle
(B) PQRS is a parallelogram
(C) diagonals of PQRS are perpendicular
(D) diagonals of PQRS are equal.

5. The quadrilateral formed by joining the mid-points of the sides of a quadrilateral PQRS, taken in order, is a rhombus, if
(A) PQRS is a rhombus
(B) PQRS is a parallelogram
(C) diagonals of PQRS are perpendicular
(D) diagonals of PQRS are equal.

6. If angles A, B, C and D of the quadrilateral ABCD, taken in order, are in the ratio 3:7:6:4, then ABCD is a
(A) rhombus (B) parallelogram
(C) trapezium (D) kite

7. If bisectors of $\angle A$ and $\angle B$ of a quadrilateral ABCD intersect each other at P, of $\angle B$ and $\angle C$ at Q, of $\angle C$ and $\angle D$ at R and of $\angle D$ and $\angle A$ at S, then PQRS is a
(A) rectangle (B) rhombus (C) parallelogram
(D) quadrilateral whose opposite angles are supplementary

8. If APB and CQD are two parallel lines, then the bisectors of the angles APQ, BPQ, CQP and PQD form
(A) a square (B) a rhombus
(C) a rectangle (D) any other parallelogram

9. The figure obtained by joining the mid-points of the sides of a rhombus, taken in order, is
(A) a rhombus (B) a rectangle
(C) a square (D) any parallelogram

10. D and E are the mid-points of the sides AB and AC of ΔABC and O is any point on side BC. O is joined to A. If P and Q are the mid-points of OB and OC respectively, then DEQP is
(A) a square (B) a rectangle
(C) a rhombus (D) a parallelogram

11. The figure formed by joining the mid-points of the sides of a quadrilateral ABCD, taken in order, is a square only if,
(A) ABCD is a rhombus
(B) diagonals of ABCD are equal
(C) diagonals of ABCD are equal and perpendicular
(D) diagonals of ABCD are perpendicular.

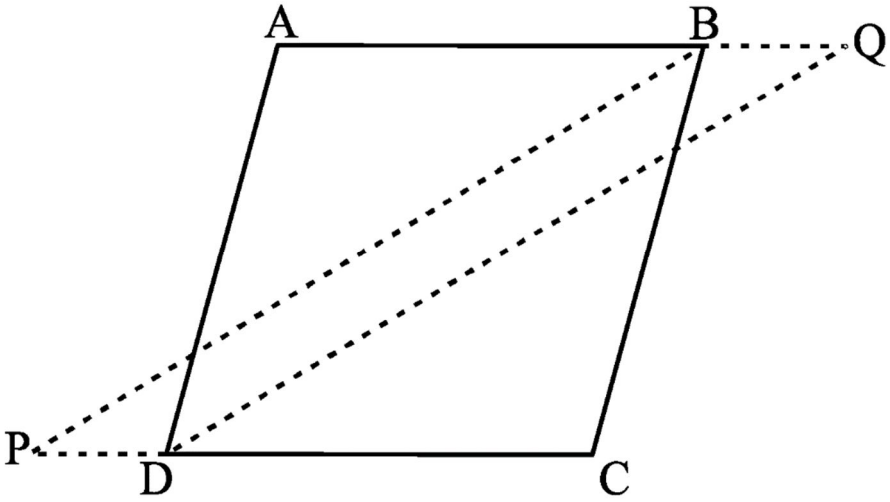
12. The diagonals AC and BD of a parallelogram ABCD intersect each other at the point O. If $\angle DAC = 32^0$ and $\angle AOB = 70^0$, then $\angle DBC$ is equal to
(A) 24^0 (B) 86^0 (C) 38^0 (D) 32^0

13. D and E are the mid-points of the sides AB and AC respectively of ΔABC. DE is produced to F. To prove that CF is equal and parallel to DA, we need an additional information which is
(A) $\angle DAE = \angle EFC$
(B) AE = EF
(C) DE = EF
(D) $\angle ADE = \angle ECF$.

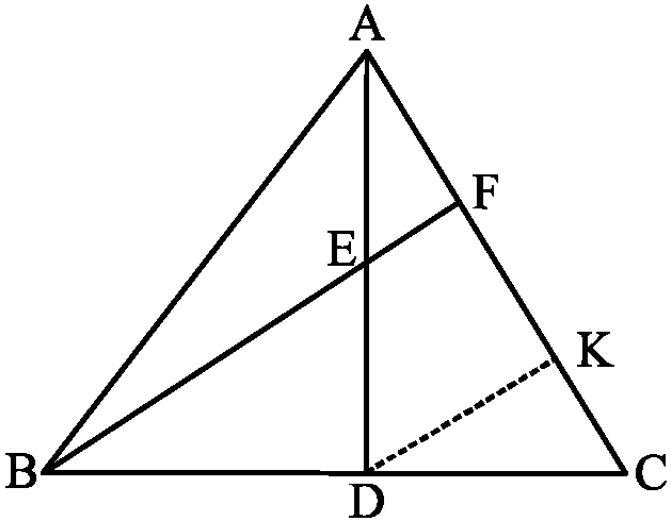
14. Which of the following is not true for a parallelogram?
(A) opposite sides are equal
(B) opposite angles are equal
(C) opposite angles are bisected by the diagonals
(D) diagonals bisect each other.

PRACTICE QUESTIONS
CLASS IX: CHAPTER – 8
QUADRILATERALS

1. In the below figure, bisectors of ∠B and ∠D of quadrilateral ABCD meets CD and AB, produced at P and Q respectively. Prove that $\angle P + \angle Q = \frac{1}{2}(\angle ABC + \angle ADC)$



2. In ΔABC, AD is the median through A and E is the midpoint of AD. BE produced meets AC in F such that BF || DK. Prove that $AF = \frac{1}{3}AC$



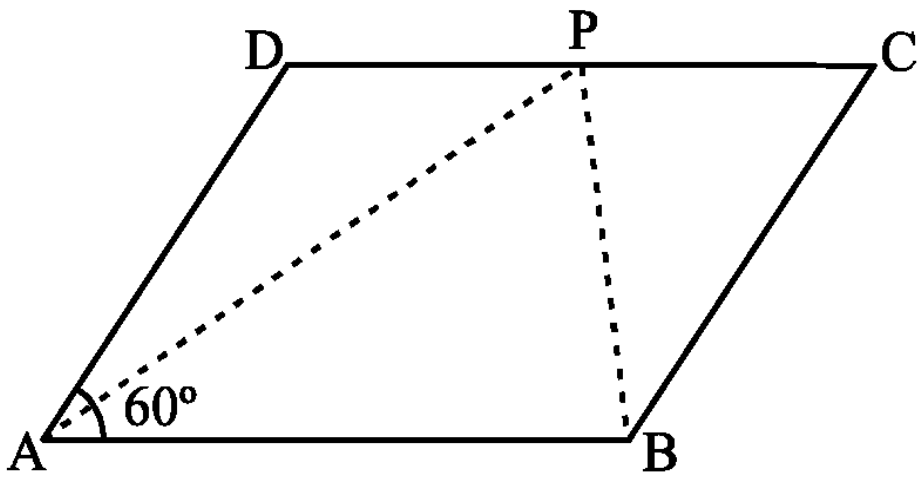
3. In a parallelogram, the bisectors of any two consecutive angles intersects at right angle. Prove it.

4. In a quadrilateral ABCD, AO and BO are the bisectors of ∠A and ∠B respectively. Prove that $\angle AOB = \frac{1}{2}(\angle C + \angle D)$

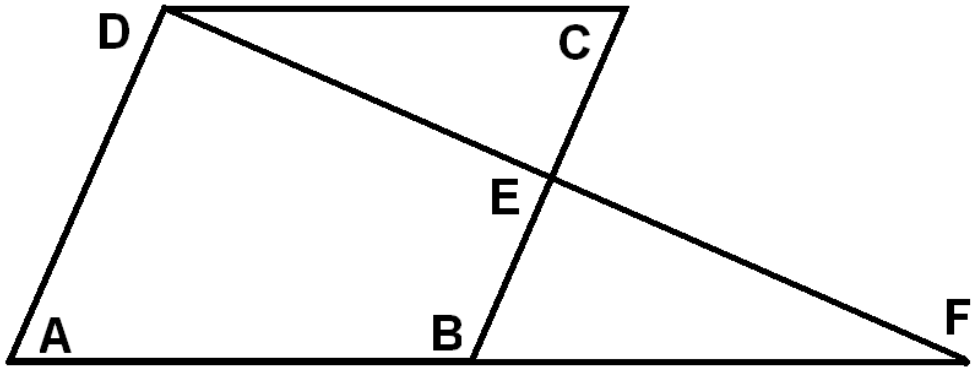
5. ABCD is a square E, F, G, H are points on AB, BC, CD and DA respectively such that AE = BF = CG = DH. Prove that EFGH is a square.

6. ABCD is a parallelogram. If its diagonals are equal, then find the value of ∠ABC.

7. In the below figure, ABCD is a parallelogram and $\angle DAB = 60^0$. If the bisector AP and BP of angles A and B respectively meet P on CD. Prove that P is the midpoint of CD.



8. In the below given figure, ABCD is a parallelogram and E is the midpoint of side BC, DE and AB when produced meet at F. Prove that AF = 2AB.



9. ΔABC is right angle at B and P is the midpoint of AC and Q is any point on AB. Prove that (i) $PQ \perp AB$ (ii) Q is the midpoint of AB (iii) $PA = \frac{1}{2} AC$

10. The diagonals of a parallelogram ABCD intersect at O. A line through O intersects AB at X and DC at Y. Prove that OX = OY.

11. ABCD is a parallelogram. AB is produced to E so that BE = AB. Prove that ED bisects BC.

12. If ABCD is a quadrilateral in which AB || CD and AD = BC, prove that $\angle A = \angle B$.

13. Diagonals AC and BD of a parallelogram ABCD intersect each other at O. If OA = 3 cm and OD = 2 cm, determine the lengths of AC and BD.

14. In quadrilateral ABCD, $\angle A + \angle D = 180^0$. What special name can be given to this quadrilateral?

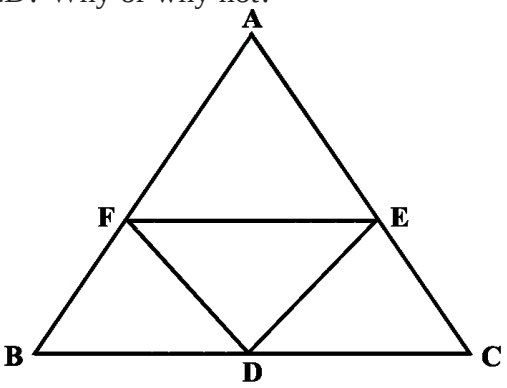
15. All the angles of a quadrilateral are equal. What special name is given to this quadrilateral?

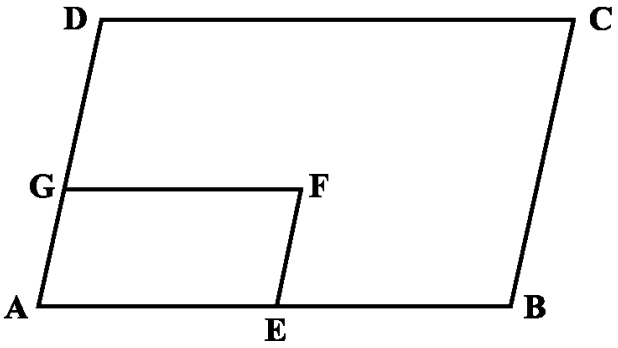
16. In ΔABC, AB = 5 cm, BC = 8 cm and CA = 7 cm. If D and E are respectively the mid-points of AB and BC, determine the length of DE.

17. Diagonals of a quadrilateral ABCD bisect each other. If $\angle A = 35^0$, determine $\angle B$.

18. Opposite angles of a quadrilateral ABCD are equal. If AB = 4 cm, determine CD.

19. In the below figure, it is given that BDEF and FDCE are parallelograms. Can you say that BD = CD? Why or why not?

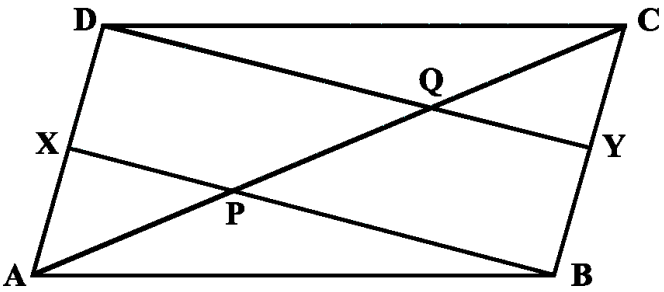




20. In the above right sided figure, ABCD and AEFG are two parallelograms. If $\angle C = 55^0$, determine $\angle F$.

21. Angles of a quadrilateral are in the ratio 3 : 4 : 4 : 7. Find all the angles of the quadrilateral.

22. In the below figure, X and Y are respectively the mid-points of the opposite sides AD and BC of a parallelogram ABCD. Also, BX and DY intersect AC at P and Q, respectively. Show that AP = PQ = QC.



23. One angle of a quadrilateral is of 108° and the remaining three angles are equal. Find each of the three equal angles.

24. ABCD is a trapezium in which AB || DC and $\angle A = \angle B = 45^0$. Find angles C and D of the trapezium.

25. The angle between two altitudes of a parallelogram through the vertex of an obtuse angle of the parallelogram is 60°. Find the angles of the parallelogram.

26. ABCD is a rhombus in which altitude from D to side AB bisects AB. Find the angles of the rhombus.

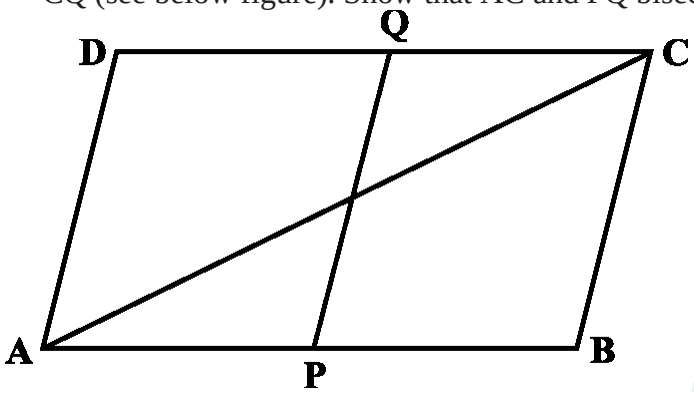
27. E and F are points on diagonal AC of a parallelogram ABCD such that AE = CF. Show that BFDE is a parallelogram.

28. ABCD is a parallelogram and $\angle DAB = 60^0$. If the bisectors AP and BP of angles A and B respectively, meet at P on CD, prove that P is the midpoint of CD.

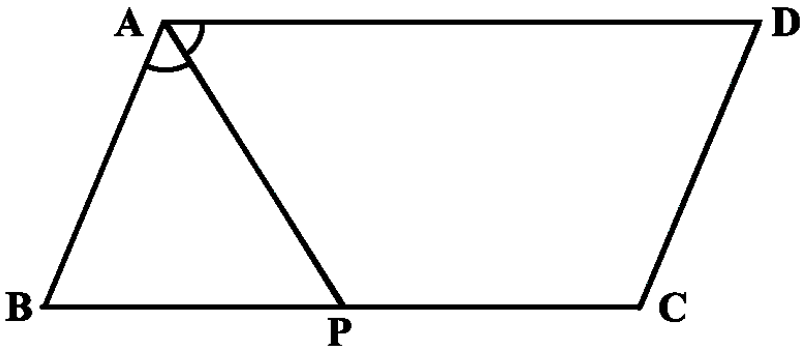
29. ABCD is a parallelogram. AM and BN are respectively, the perpendiculars from A and B to DC and CD produced. Prove that AM = BN.

30. ABCD is a parallelogram. L and M are points on AB and DC respectively and AL = CM. Prove that LM and BD bisect each other.

31. Points P and Q have been taken on opposite sides AB and CD, respectively of a parallelogram ABCD such that AP = CQ (see below figure). Show that AC and PQ bisect each other.



32. In the below figure, P is the mid-point of side BC of a parallelogram ABCD such that ∠BAP = ∠DAP. Prove that AD = 2CD.



33. D, E and F are the mid-points of the sides BC, CA and AB, respectively of an equilateral triangle ABC. Show that ΔDEF is also an equilateral triangle.

34. E is the mid-point of the side AD of the trapezium ABCD with AB || DC. A line through E drawn parallel to AB intersect BC at F. Show that F is the mid-point of BC.

35. PQ and RS are two equal and parallel line-segments. Any point M not lying on PQ or RS is joined to Q and S and lines through P parallel to QM and through R parallel to SM meet at N. Prove that line segments MN and PQ are equal and parallel to each other.

36. Prove that *"If the diagonals of a quadrilateral bisect each other, then it is a parallelogram"*.

37. Prove that *"A quadrilateral is a parallelogram if a pair of opposite sides is equal and parallel"*.

38. Prove that *"A quadrilateral is a parallelogram if its opposite angles are equal"*.

39. Show that the diagonals of a rhombus are perpendicular to each other.

40. Two parallel lines *l* and *m* are intersected by a transversal *p*. Show that the quadrilateral formed by the bisectors of interior angles is a rectangle.

41. Show that the bisectors of angles of a parallelogram form a rectangle.

42. If the diagonals of a parallelogram are equal, then show that it is a rectangle.

43. Show that if the diagonals of a quadrilateral bisect each other at right angles, then it is a rhombus.

44. Show that the diagonals of a square are equal and bisect each other at right angles.

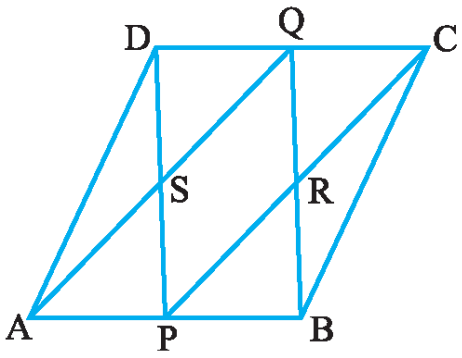
45. Show that if the diagonals of a quadrilateral are equal and bisect each other at right angles, then it is a square.

46. In the adjoining figure, ABCD is a parallelogram in which P and Q are mid-points of opposite sides AB and CD. If AQ intersects DP at S and BQ intersects CP at R, show that:

(i) APCQ is a parallelogram.

(ii) DPBQ is a parallelogram.

(iii) PSQR is a parallelogram.



47. The angles of quadrilateral are in the ratio 3 : 5 : 9 : 13. Find all the angles of the quadrilateral.

48. Prove that *"The line segment joining the mid-points of two sides of a triangle is parallel to the third side and half of it"*.

49. Prove that *"The line drawn through the mid-point of one side of a triangle, parallel to another side bisects the third side"*.

50. Show that if the diagonals of a quadrilateral are equal and bisect each other at right angles, then it is a square.

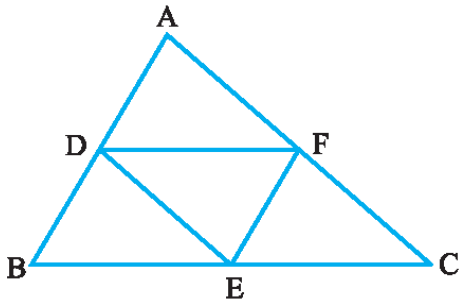
51. ABCD is a rhombus and P, Q, R and S are the mid-points of the sides AB, BC, CD and DA respectively. Show that the quadrilateral PQRS is a rectangle.

52. ABC is a triangle right angled at C. A line through the mid-point M of hypotenuse AB and parallel to BC intersects AC at D. Show that

(i) D is the mid-point of AC (ii) MD $\perp$ AC

(iii) CM = MA = $\frac{1}{2}$ AB

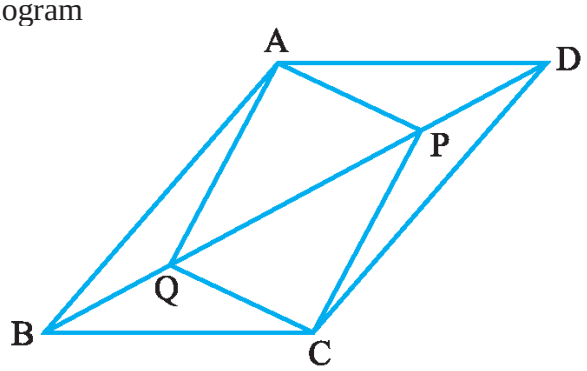
53. In ΔABC, D, E and F are respectively the mid-points of sides AB, BC and CA. Show that ΔABC is divided into four congruent triangles by joining D, E and F.



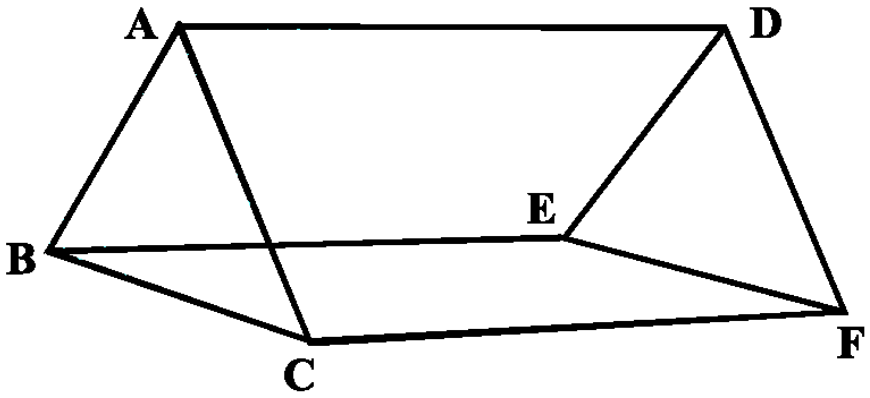
54. Prove that the quadrilateral formed by joining the mid-points of the sides of a quadrilateral, in order, is a parallelogram.

55. *l*, *m* and *n* are three parallel lines intersected by transversals *p* and *q* such that *l*, *m* and *n* cut off equal intercepts AB and BC on *p*. Show that *l*, *m* and *n* cut off equal intercepts DE and EF on *q*.

56. In parallelogram ABCD, two points P and Q are taken on diagonal BD such that DP = BQ. Show that: APCQ is a parallelogram



57. In the below figure, AB || DE, AB = DE, AC || DF and AC = DF. Prove that BC || EF and BC = EF.



58. A square is inscribed in an isosceles right triangle so that the square and the triangle have one angle common. Show that the vertex of the square opposite the vertex of the common angle bisects the hypotenuse.

59. ABCD is a rectangle and P, Q, R and S are mid-points of the sides AB, BC, CD and DA respectively. Show that the quadrilateral PQRS is a rhombus.

60. Show that the line segments joining the mid-points of the opposite sides of a quadrilateral bisect each other.

61. E and F are respectively the mid-points of the non-parallel sides AD and BC of a trapezium ABCD. Prove that EF || AB and $EF = \frac{1}{2}(AB + CD)$

62. Prove that the quadrilateral formed by the bisectors of the angles of a parallelogram is a rectangle.

63. P and Q are points on opposite sides AD and BC of a parallelogram ABCD such that PQ passes through the point of intersection O of its diagonals AC and BD. Show that PQ is bisected at O.

64. ABCD is a rectangle in which diagonal BD bisects $\angle B$. Show that ABCD is a square.

65. D, E and F are respectively the mid-points of the sides AB, BC and CA of a triangle ABC. Prove that by joining these mid-points D, E and F, the triangles ABC is divided into four congruent triangles.

66. Prove that the line joining the mid-points of the diagonals of a trapezium is parallel to the parallel sides of the trapezium.

67. P is the mid-point of the side CD of a parallelogram ABCD. A line through C parallel to PA intersects AB at Q and DA produced at R. Prove that DA = AR and CQ = QR.

68. E is the mid-point of a median AD of ⊗ABC and BE is produced to meet AC at F. Show that AF = $\frac{1}{3}$ AC

69. Show that the quadrilateral formed by joining the mid-points of the consecutive sides of a square is also a square.

70. In a parallelogram ABCD, AB = 10 cm and AD = 6 cm. The bisector of ∠A meets DC in E. AE and BC produced meet at F. Find the length of CF.

71. P, Q, R and S are respectively the mid-points of the sides AB, BC, CD and DA of a quadrilateral ABCD in which AC = BD. Prove that PQRS is a rhombus.

72. P, Q, R and S are respectively the mid-points of the sides AB, BC, CD and DA of a quadrilateral ABCD such that AC ⊥ BD. Prove that PQRS is a rectangle.

73. P, Q, R and S are respectively the mid-points of sides AB, BC, CD and DA of quadrilateral ABCD in which AC = BD and AC ⊥ BD. Prove that PQRS is a square.

74. A diagonal of a parallelogram bisects one of its angles. Show that it is a rhombus. P and Q are the mid-points of the opposite sides AB and CD of a parallelogram

75. In quadrilateral ABCD. AQ intersects DP at S and BQ intersects CP at R. Show that PRQS is a parallelogram.

76. ABCD is a quadrilateral in which AB || DC and AD = BC. Prove that ∠A = ∠B and ∠C = ∠D.

77. ABC is a triangle. D is a point on AB such AD = $\frac{1}{4}$ AB and E is a point on AC such that AE = $\frac{1}{4}$ AC. Prove that DE = $\frac{1}{4}$ BC.

78. Let ABC be an isosceles triangle in which AB = AC. If D, E, F be the midpoints of the sides BC, CA and AB respectively, show that the segment AD and EF bisect each other at right angles.

79. Prove that the line segment joining the mid-points of the diagonals of a trapezium is parallel to each of the parallel sides and is equal to half the difference of these sides.

80. P is the midpoint of side AB of a parallelogram ABCD. A line through B parallel to PD meets DC at Q and AD produced at R. Prove that (i) AR = 2BC (ii) BR = 2BQ.

MCQ WORKSHEET-I
CLASS IX: CHAPTER – 10
CIRCLES

1. The centre of a circle lies in _____ of the circle.
(a)exterior (b) interior (c) boundary (d) none of these

2. A point, whose distance from the centre of a circle is greater than its radius lies in of the circle.
(a)exterior (b) interior (c) boundary (d) none of these

3. The longest chord of a circle is a _____ of the circle.
(a) diameter (b) semicircle (c) chord (d) sector

4. Segment of a circle is the region between an arc and _____ of the circle.
(a) diameter (b) semicircle (c) chord (d) sector

5. A circle divides the plane, on which it lies, in parts.
(a) two (b) three (c) four (d) five

6. *Equal chords of a circle subtend _____angles at the centre.*
(a) half (b) one third (c) one fourth (d) equal

7. *If the angles subtended by the chords of a circle at the centre are equal, then the chords are _____.*
(a) half (b) one third (c) one fourth (d) equal

8. *The perpendicular from the centre of a circle to a chord _____ the chord.*
(a) trisect (b) bisect (c) coincide (d) none of these.

9. *The line drawn through the centre of a circle to _____ a chord is perpendicular to the chord.*
(a) trisect (b) bisect (c) coincide (d) none of these.

10. *There is one and only one circle passing through _____ given non-collinear points.*
(a) two (b) three (c) four (d) five

11. *Chords equidistant from the centre of a circle are _____ in length.*
(a) half (b) one third (c) one fourth (d) equal

12. *The angle subtended by an arc at the centre is _____ the angle subtended by it at any point on the remaining part of the circle.*
(a) half (b) double (c) triple (d) equal

13. *Angles in the same segment of a circle are equal.*
(a) half (b) double (c) triple (d) equal

14. *The sum of either pair of opposite angles of a cyclic quadrilateral is _____.*
(a) 180º. (b) 360º (c) 90º (d) none of these

15. *If the sum of a pair of opposite angles of a quadrilateral is _____, the quadrilateral is cyclic.*
(a) 180º. (b) 360º (c) 90º (d) none of these

MCQ WORKSHEET-II
CLASS IX: CHAPTER – 10
CIRCLES

1. The length of a chord of circle of radius 10 cm is 12 cm. Determine the distance of the chord from the centre
(a) 8 cm (b) 7 cm (c) 6 cm (d) 5 cm

2. The length of a chord of circle is 4 cm. If its perpendicular distance from the centre is 1.5 cm, determine the radius of the circle.
(a) 2.5 cm (b) 1.5 cm (c) 6 cm (d) 5 cm

3. The radius of the circle is 5 cm and distance of the chord from the centre of the circle is 4 cm. Find the length of the chord.
(a) 8 cm (b) 7 cm (c) 6 cm (d) 5 cm

4. Find the length of a chord, which is at a distance of 24 cm from the centre of a circle whose diameter is 50 cm.
(a) 12 cm (b) 14 cm (c) 16 cm (d) 15 cm

5. Two points A and B are 16 cm apart. A circle with radius 17 cm is drawn to pass through these points. Find the distance of AB from the centre of the circle.
(a) 12 cm (b) 14 cm (c) 16 cm (d) 15 cm

6. If the length of a chord of a circle at a distance of 5 cm from the centre of the circle is 24 cm, find the radius of the circle.
(a) 13 cm (b) 14 cm (c) 16 cm (d) 15 cm

7. A chord 6 cm long is drawn in a circle with a diameter equal to 10 cm. Find its perpendicular distance from the centre.
(a) 4 cm (b) 7 cm (c) 6 cm (d) 5 cm

8. If the length of a chord of a circle at a distance of 24 cm from the centre of the circle is 36 cm, find the length of the greatest chord of the circle.
(a) 80 cm (b) 70 cm (c) 60 cm (d) 50 cm

9. AB is a chord of the circle with centre O and radius 13 cm. If OM $\perp$ AB and OM =5 cm, find th length of the chord AB.
(a) 24 cm (b) 27 cm (c) 26 cm (d) 25 cm

10. A chord of a circle of radius 7.5 cm with centre O is of length 9 cm. Find the its distance from the centre.
(a) 4 cm (b) 7 cm (c) 6 cm (d) 5 cm

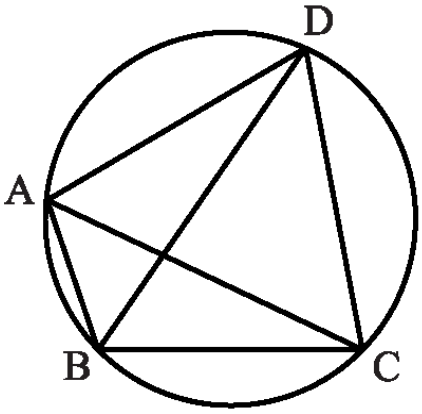
11. Two circles of radii 5 cm and 3 cm intersect at two points and the distance between their centres is 4 cm. Find the length of the common chord.
(a) 4 cm (b) 7 cm (c) 6 cm (d) 5 cm

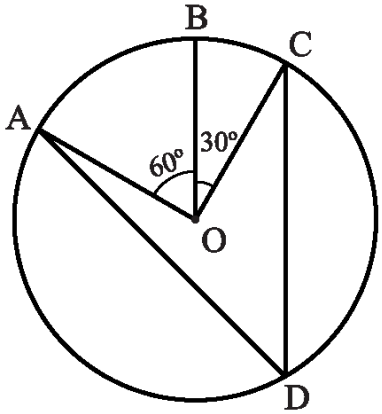
12. In a circle of radius 25 cm, AB and AC are two chords, such that AB = AC = 30 cm . Find the length of the chord.
(a) 40 cm (b) 48 cm (c) 60 cm (d) 50 cm

MCQ WORKSHEET-III
CLASS IX: CHAPTER – 10
CIRCLES

1. In below Fig, ABCD is a cyclic quadrilateral in which AC and BD are its diagonals. If ∠ DBC = 55° and ∠BAC = 45°, find ∠BCD.

(a) 80º (b) 60º (c) 90º (d) none of these





2. In above sided Fig, A,B and C are three points on a circle with centre O such that ∠BOC = 30° and ∠AOB = 60°. If D is a point on the circle other than the arc ABC, find ∠ADC.

(a) 45º (b) 60º (c) 90º (d) none of these

3. A chord of a circle is equal to the radius of the circle. Find the angle subtended by the chord at a point on the minor arc

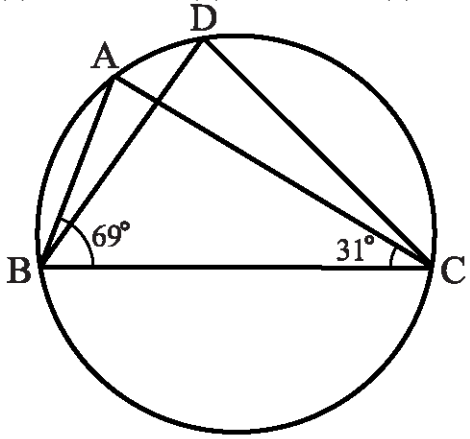
(a) 150^0 (b) 30º (c) 60º (d) none of these

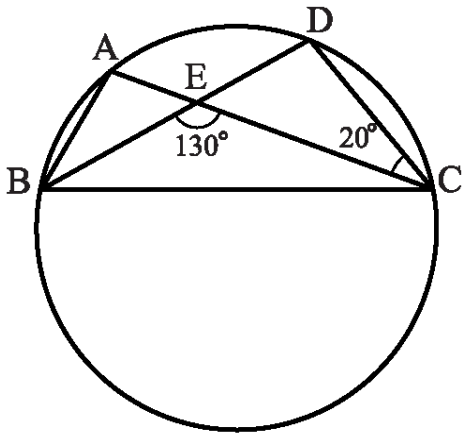
4. A chord of a circle is equal to the radius of the circle. Find the angle subtended by the chord at a point on the major arc.

(a) 150^0 (b) 30º (c) 60º (d) none of these

5. In the below Fig., ∠ABC = 69°, ∠ACB = 31°, find ∠BDC.

(a) 80º (b) 60º (c) 90º (d) 100^0





6. In the above sided Fig., A, B, C and D are four points on a circle. AC and BD intersect at a point E such that ∠BEC = 130° and ∠ECD = 20°. Find ∠BAC.

(a) 110º (b) 150º (c) 90º (d) 100^0

7. ABCD is a cyclic quadrilateral whose diagonals intersect at a point E. If ∠DBC = 70°, ∠BAC is 30°, find ∠BCD.

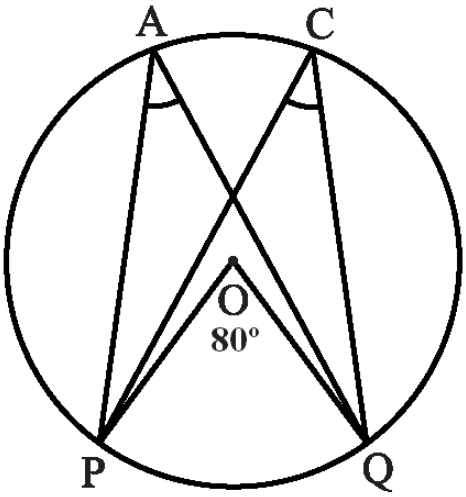
(a) 80º (b) 60º (c) 90º (d) 100^0

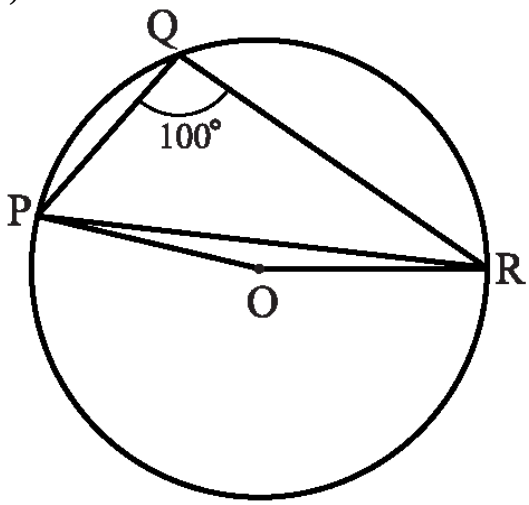
8. ABCD is a cyclic quadrilateral. If ∠BCD = 100°, ∠ABD is 30°, find ∠ABD.
(a) 80º (b) 60º (c) 90º (d) 70^0

9. ABCD is a cyclic quadrilateral. If ∠DBC= 80°, ∠BAC is 40°, find ∠BCD.
(a) 80º (b) 60º (c) 90º (d) 70^0

10. ABCD is a cyclic quadrilateral in which BC is parallel to AD, ∠ADC = 110^0 and ∠BAC = 50^0. Find ∠DAC
(a) 80º (b) 60º (c) 90º (d) 170^0

11. In the below figure, ∠POQ= 80^0, find ∠PAQ
(a) 80º (b) 40º (c) 100º (d) none of these





12. In the above figure, ∠PQR = 100°, where P, Q and R are points on a circle with centre O. Find ∠OPR.
(a) 80º (b) 40º (c) 10º (d) none of these

MCQ WORKSHEET-IV
CLASS IX: CHAPTER – 10
CIRCLES

1. Distance of chord AB from the centre is 12 cm and length of the chord is 10 cm. Then diameter of the circle is

A. 26 cm B. 13 cm C. $\sqrt{244}$ cm D. 20 cm

2. Two circles are drawn with side AB and AC of a triangle ABC as diameters. Circles intersect at a point D, Then

A. $\angle ADB$ and $\angle ADC$ are equal B. $\angle ADB$ and $\angle ADC$ are compementary

C. Points B, D, C are collinear D. none of these

3. The region between a chord and either of the arcs is called

A. an arc B. a sector C. a segment D. a semicircle

4. A circle divides the plane in which it lies, including circle in

A. 2 parts B. 3 parts C. 4 parts D. 5 parts

5. If diagonals of a cyclic quadrilateral are the diameters of a circle through the vertices of a quadrilateral, then quadrilateral is a

A. parallelogram B. square C. rectangle D. trapezium

6. Given three non collinear points, then the number of circles which can be drawn through these three points are

A. one B. zero C. two D. infinite

Distance of chord AB from the centre is 12 cm and length of the chord is 10cm. Then diameter of the circle is

7. In a circle with centre O, AB and CD are two diameters perpendicular to each other. The length of chord AC is

A. 2 AB B. $\sqrt{2}$ AB C. $\frac{1}{2}$AB D. $\frac{1}{\sqrt{2}}$AB

8. If AB is a chord of a circle, P and Q are the two points on the circle different from A and B, then

A. $\angle APB = \angle AQB$

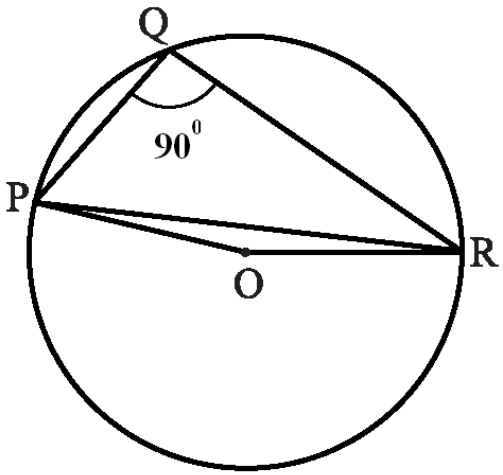
B. $\angle APB + \angle AQB = 180°$

C. $\angle APB + \angle AQB = 90°$

D. $\angle APB + \angle AQB = 180°$

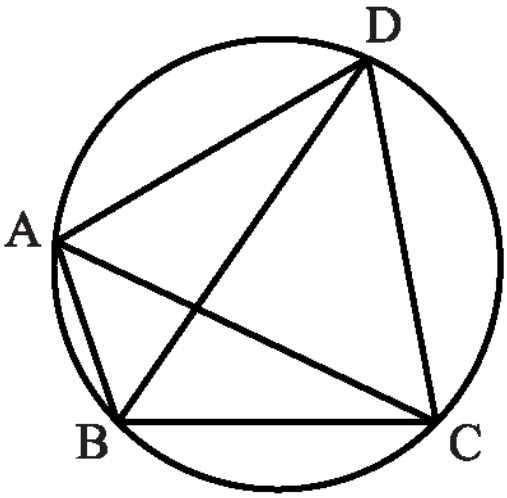
9. In the above figure, ∠PQR = 90°, where P, Q and R are points on a circle with centre O. Find reflex∠POR.

(a) 180º (b) 140º (c) 45º (d) none of these



10. In below Fig, ABCD is a cyclic quadrilateral in which AC and BD are its diagonals. If ∠ DBC = 60° and ∠BAC = 30°, find ∠BCD.

(a) 80º (b) 60º (c) 90º (d) none of these



PRACTICE QUESTIONS
CHAPTER – 10: CIRCLES

1. Prove that *"Equal chords of a circle subtend equal angles at the centre".*

2. Prove that *"Chords of a circle which subtends equal angles at the centre are equal".*

3. Prove that "*The perpendicular from the centre of a circle to a chord bisects the chord."*

4. Prove that "*The line drawn through the centre of a circle to bisect a chord is perpendicular to the chord".*

5. Prove that "*Chords equidistant from the centre of a circle are equal in length"*

6. Prove that "*Chords of a circle which are equidistant from the centre are equal"*

7. Prove that *"Of any two chords of a circle then the one which is larger is nearer to the centre."*

8. Prove that *"Of any two chords of a circle then the one which is nearer to the centre is larger."*

9. Prove that *"line joining the midpoints of two equal chords of circle subtends equal angles with the chord."*

10. *Prove that "if two chords of a circle bisect each other they must be diameters.*

11. If two chords of a circle are equally inclined to the diameter through their point of intersection, prove that the chords are equal.

12. Prove that "*The angle subtended by an arc at the centre is double the angle subtended by it at any point on the remaining part of the circle."*

13. Prove that *"Angles in the same segment of a circle are equal."*

14. Prove that *"Angle in a semicircle is a right angle."*

15. Prove that *"Arc of a circle subtending a right angle at any point of the circle in its alternate segment is a semicircle."*

16. Prove that *"Any angle subtended by a minor arc in the alternate segment is acute and any angle subtended by a major arc in the alternate segment is obtuse."*

17. Prove that *"If a line segment joining two points subtends equal angles at two other points lying on the same side of the line segment, the four points are concyclic."*

18. Prove that *"Circle drawn on any one side of the equal sides of an isosceles trainlge as diameter bisects the side."*

19. Prove that "*The sum of either pair of opposite angles of a cyclic quadrilateral is* 180^{o}."

20. Prove that "*If the sum of a pair of opposite angles of a quadrilateral is* 180^{o}*, the quadrilateral is cyclic."*

21. Prove that *"If one side of the cyclic quadrilateral is produced then the exterior angle is equal to the interior opposite angle."*

22. Prove that *"If two sides of a cyclic quadrilateral are parallel, then the remaining two sides are equal and the diagonals are also equal."*

23. Prove that *"If two opposite sides of cyclic quadrilateral are equal, then the other two sides are parallel."*

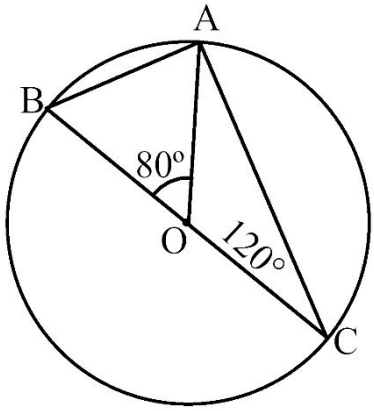
24. Prove that *"If two non parallel sides of a trapezium are equal, it is cyclic."*

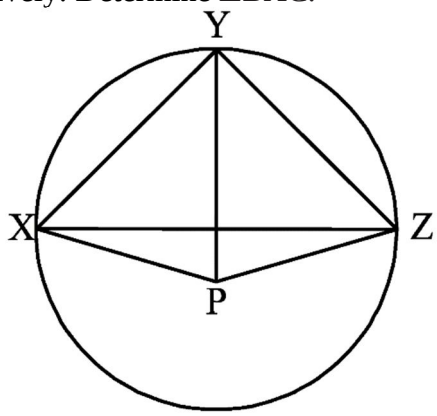
25. Prove that *"The sum of the angles in the four segments exterior to a cyclic quadrilateral is equal to 6 right angles."*

26. Two circles with centres A and B intersect at C and D. Prove that $\angle ACB = \angle ADB$.

27. Bisector AD of AC of ΔABC passes through the centre of the circumcircle of ΔABC. Prove that AB = AC.

28. In the below figure A, B and C are three points on a circle such that angles subtended by the chords AB and AC at the centre O are 80^0 and 120^0 respectively. Determine $\angle BAC$.

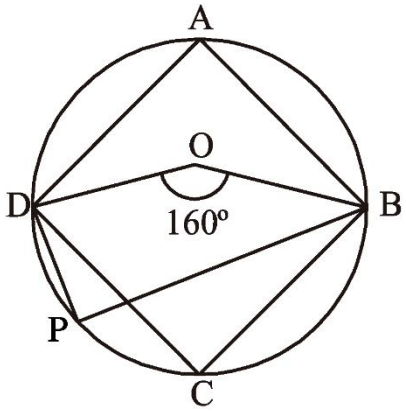




29. In the above right-sided figure, P is the centre of the circle. Prove that $\angle XPZ = 2\,(\angle XZY + \angle YXZ)$.

30. Prove that the midpoint of the hypotenuse of a right triangle is equidistant from its vertices.

31. In the below figure ABCD is a cyclic quadrilateral, O is the centre of the circle. If $\angle BOD = 160^0$, find $\angle BPD$.



32. Prove that in a triangle if the bisector of any angle and the perpendicular bisector of its opposite side intersect, they will intersect on the circumcircle of the triangle.

33. The diagonals of a cyclic quadrilateral are at right angles. Prove that perpendicular from the point of their intersection on any side when produced backward bisect the opposite side.

34. If two circles intersect at two points, prove that their centres lie on the perpendicular bisector of the common chord.

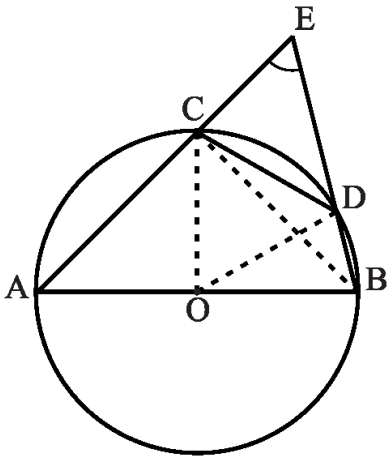
35. If two intersecting chords of a circle make equal angles with the diameter passing through their point of intersection, prove that the chords are equal.

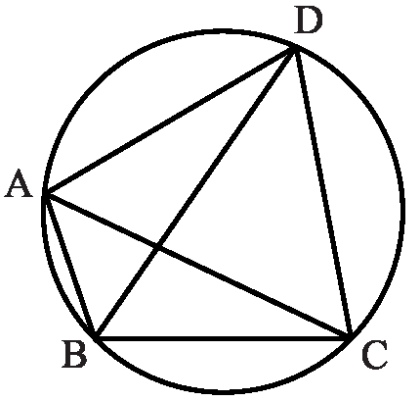
36. Two circles of radii 5 cm and 3 cm intersect at two points and the distance between their centres is 4 cm. Find the length of the common chord.

37. If two equal chords of a circle intersect within the circle, prove that the segments of one chord are equal to corresponding segments of the other chord.

38. If two equal chords of a circle intersect within the circle, prove that the line joining the point of intersection to the centre makes equal angles with the chords.

39. In the below figure, AB is a diameter of the circle, CD is a chord equal to the radius of the circle. AC and BD when extended intersect at a point E. Prove that ∠AEB = 60°.





40. In the above right-sided figure, ABCD is a cyclic quadrilateral in which AC and BD are its diagonals. If ∠DBC = 55° and ∠BAC = 45°, find ∠BCD.

41. Prove that the quadrilateral formed (if possible) by the internal angle bisectors of any quadrilateral is cyclic.

42. ABCD is a cyclic quadrilateral whose diagonals intersect at a point E. If ∠DBC = 70°, ∠BAC is 30°, find ∠BCD. Further, if AB = BC, find ∠ECD.

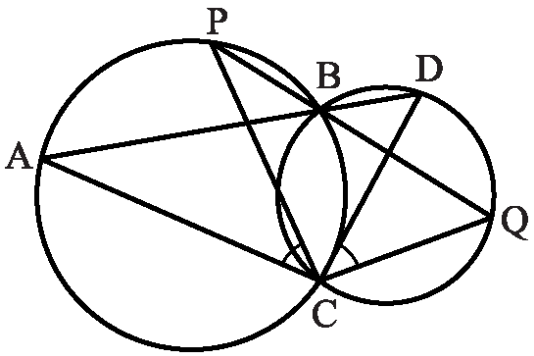
43. If diagonals of a cyclic quadrilateral are diameters of the circle through the vertices of the quadrilateral, prove that it is a rectangle.

44. Two circles intersect at two points A and B. AD and AC are diameters to the two circles. Prove that B lies on the line segment DC.

45. Prove that the quadrilateral formed (if possible) by the internal angle bisectors of any quadrilateral is cyclic.

46. If the non-parallel sides of a trapezium are equal, prove that it is cyclic.

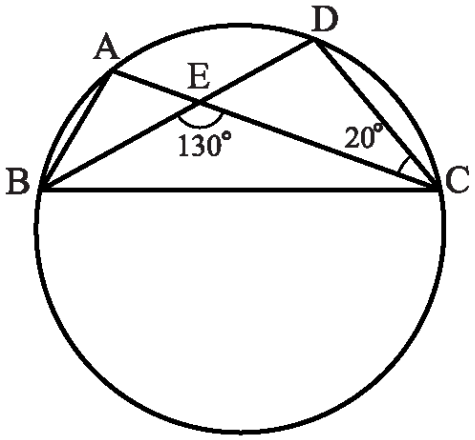
47. Two circles intersect at two points B and C. Through B, two line segments ABD and PBQ are drawn to intersect the circles at A, D and P, Q respectively. Prove that ∠ACP = ∠QCD.

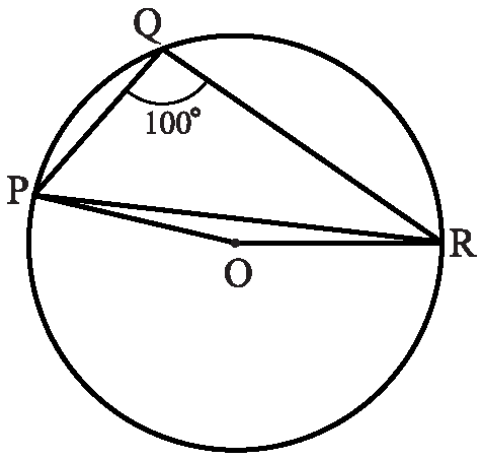


48. If circles are drawn taking two sides of a triangle as diameters, prove that the point of intersection of these circles lie on the third side.

49. Prove that the circle drawn with any side of a rhombus as diameter, passes through the point of intersection of its diagonals.

50. In the adjoining figure, A, B, C and D are four points on a circle. AC and BD intersect at a point E such that ∠BEC = 130° and ∠ECD = 20°. Find ∠BAC.





51. In the above right-sided figure, ∠PQR = 100°, where P, Q and R are points on a circle with centre O. Find ∠OPR.

52. ABCD is a parallelogram. The circle through A, B and C intersect CD (produced if necessary) at E. Prove that AE = AD.

53. AC and BD are chords of a circle which bisect each other. Prove that (i) AC and BD are diameters, (ii) ABCD is a rectangle.

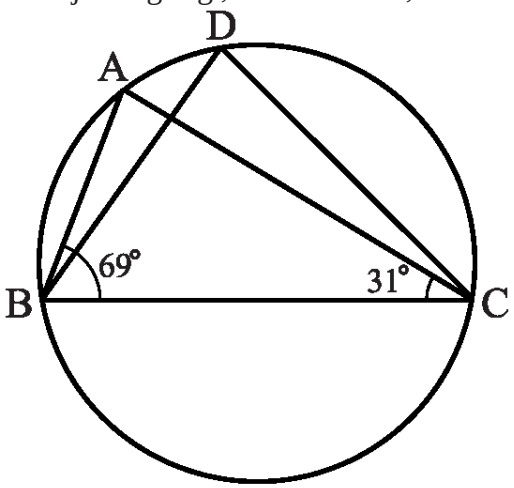
54. A chord of a circle is equal to the radius of the circle. Find the angle subtended by the chord at a point on the minor arc and also at a point on the major arc.

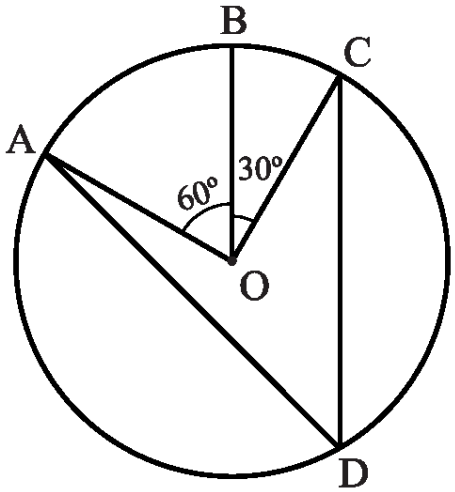
55. Prove that the circle drawn with any side of a rhombus as a diameter, passes through the point of its diagonals.

56. Bisectors of angles A, B and C of a triangles ABC intersect its circumcircle at D, E and F respectively. Prove that the angles of DDEF are $90^0 - \frac{A}{2}$, $90^0 - \frac{B}{2}$ and $90^0 - \frac{C}{2}$

57. Prove that the line of centres of two intersecting circles subtends equal angles at the two points of intersection.

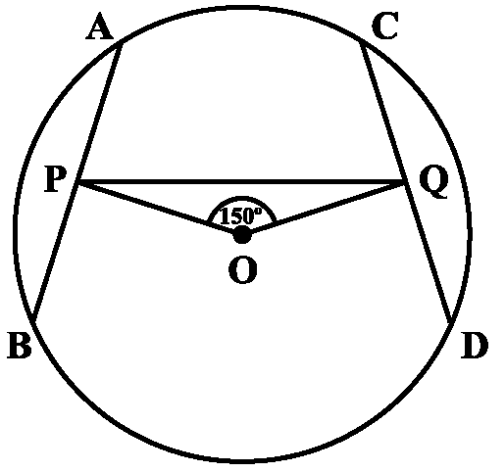
58. In the adjoining Fig., ∠ABC = 69°, ∠ACB = 31°, find ∠BDC.

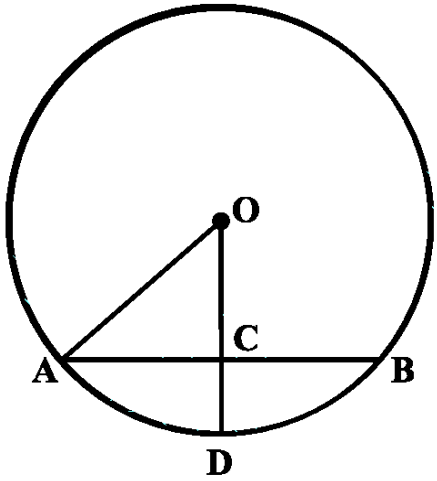




59. In the above right-sided figure, A,B and C are three points on a circle with centre O such that ∠BOC = 30° and ∠AOB = 60°. If D is a point on the circle other than the arc ABC, find ∠ADC.

60. In the below figure, AB and CD are two equal chords of a circle with centre O. OP and OQ are perpendiculars on chords AB and CD, respectively. If ∠POQ = 150°, then find ∠APQ.





61. In the above right sided figure, if OA = 5 cm, AB = 8 cm and OD is perpendicular to AB, then find CD.

62. Two chords AB and CD of lengths 5 cm and 11 cm respectively of a circle are parallel to each other and are on opposite sides of its centre. If the distance between AB and CD is 6 cm, find the radius of the circle.

63. Two congruent circles intersect each other at points A and B. Through A any line segment PAQ is drawn so that P, Q lie on the two circles. Prove that BP = BQ.

64. In any triangle ABC, if the angle bisector of ∠A and perpendicular bisector of BC intersect, prove that they intersect on the circumcircle of the triangle ABC.

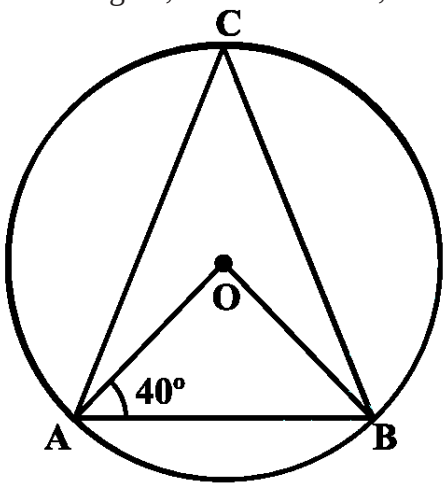
65. If arcs AXB and CYD of a circle are congruent, find the ratio of AB and CD.

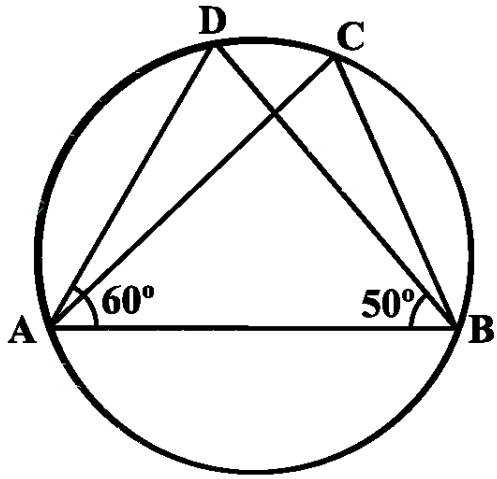
66. If the perpendicular bisector of a chord AB of a circle PXAQBY intersects the circle at P and Q, prove that arc PXA ≅ Arc PYB.

67. A, B and C are three points on a circle. Prove that the perpendicular bisectors of AB, BC and CA are concurrent.

68. AB and AC are two equal chords of a circle. Prove that the bisector of the angle BAC passes through the centre of the circle.

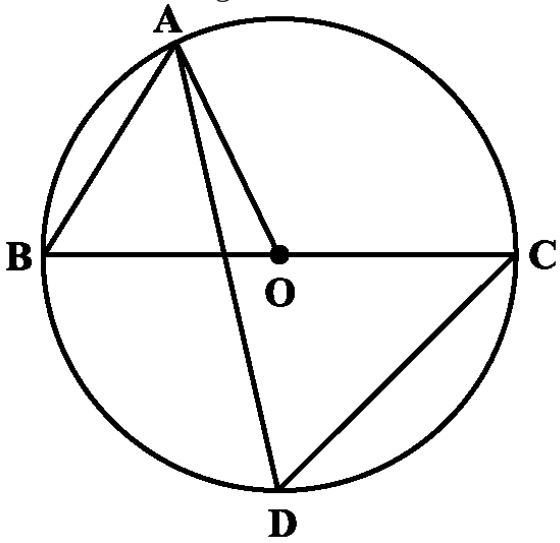
69. In the below figure, if $\angle OAB = 40^0$, then find $\angle ACB$

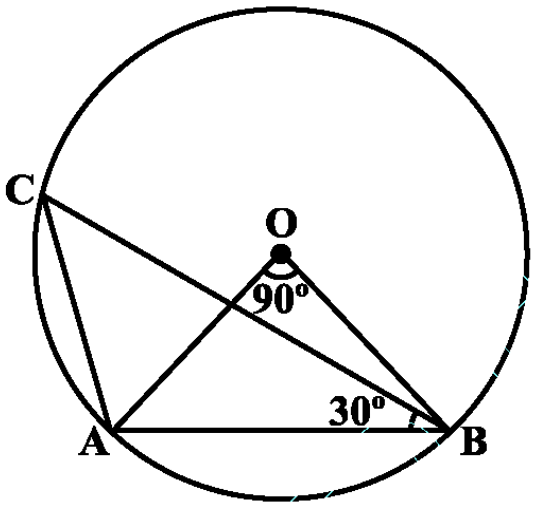




70. In the above right sided figure, if $\angle DAB = 60^0$, $\angle ABD = 50^0$ then find $\angle ACB$.

71. In the below figure, BC is a diameter of the circle and $\angle BAO = 60^0$ then find $\angle ADC$





72. In above right sided figure, $\angle AOB = 90^0$ and $\angle ABC = 30^0$, then find $\angle CAO$

73. The lengths of two parallel chords of a circle are 6 cm and 8 cm. If the smaller chord is at distance 4 cm from the centre, what is the distance of the other chord from the centre?

74. A, B, C D are four consecutive points on a circle such that AB = CD. Prove that AC = BD.

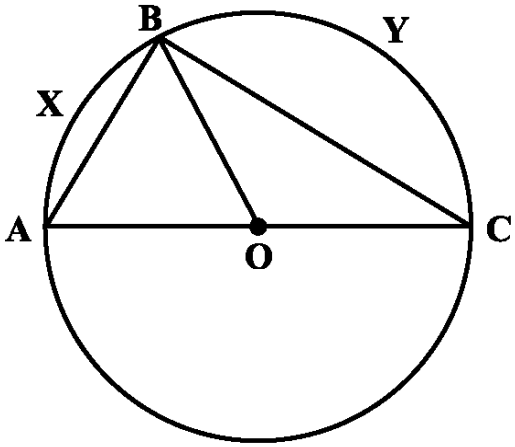
75. If a line segment joining mid-points of two chords of a circle passes through the centre of the circle, prove that the two chords are parallel.

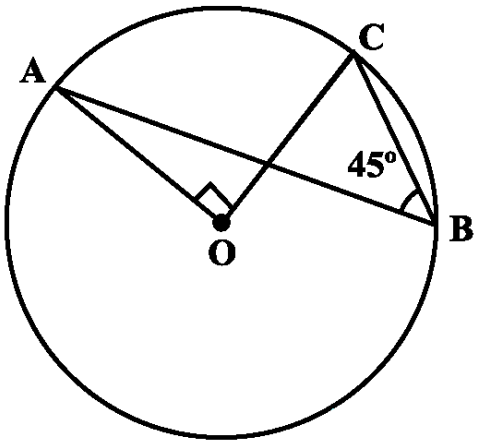
76. ABCD is such a quadrilateral that A is the centre of the circle passing through B, C and D. Prove that $\angle CBD + \angle CDB = \frac{1}{2}\angle BAD$

77. O is the circumcentre of the triangle ABC and D is the mid-point of the base BC. Prove that $\angle BOD = \angle A$.

78. On a common hypotenuse AB, two right triangles ACB and ADB are situated on opposite sides. Prove that $\angle BAC = \angle BDC$.

79. In the below figure, AOC is a diameter of the circle and arc(AXB) = $\frac{1}{2}$ arc(BYC). Find ∠BOC.





80. In the above right sided figure, ∠ABC = 45^0, prove that OA ⊥ OC.

81. Two chords AB and AC of a circle subtends angles equal to 90° and 150°, respectively at the centre. Find ∠BAC, if AB and AC lie on the opposite sides of the centre.

82. If BM and CN are the perpendiculars drawn on the sides AC and AB of the triangle ABC, prove that the points B, C, M and N are concyclic.

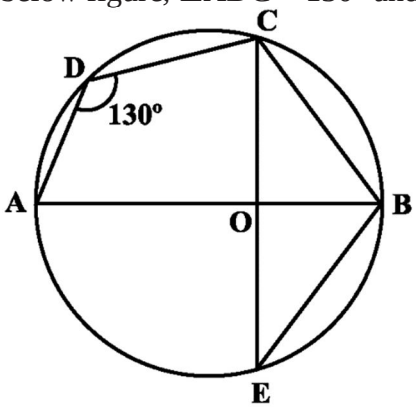
83. If a line is drawn parallel to the base of an isosceles triangle to intersect its equal sides, prove that the quadrilateral so formed is cyclic.

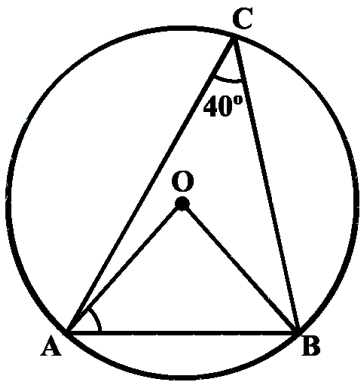
84. If a pair of opposite sides of a cyclic quadrilateral are equal, prove that its diagonals are also equal.

85. The circumcentre of the triangle ABC is O. Prove that ∠OBC + ∠BAC = 90^0.

86. A chord of a circle is equal to its radius. Find the angle subtended by this chord at a point in major segment.

87. In the below figure, ∠ADC = 130° and chord BC = chord BE. Find ∠CBE.



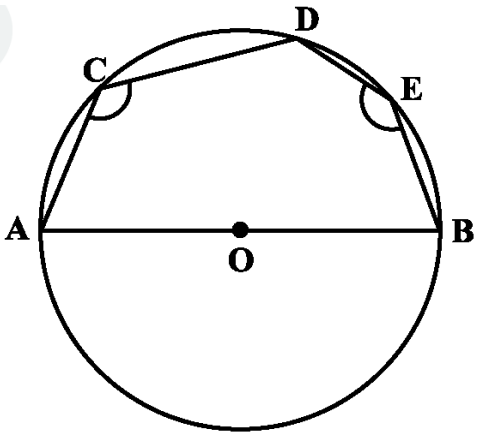


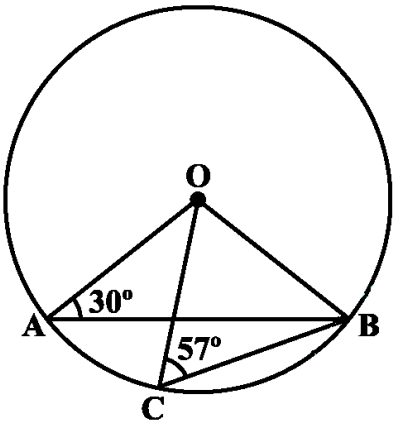
88. In the above right sided figure, ∠ACB = 40^0. Find ∠OAB.

89. A quadrilateral ABCD is inscribed in a circle such that AB is a diameter and ∠ADC = 130^0. Find ∠BAC.

90. Two circles with centres O and O' intersect at two points A and B. A line PQ is drawn parallel to OO' through A(or B) intersecting the circles at P and Q. Prove that PQ = 2 OO'

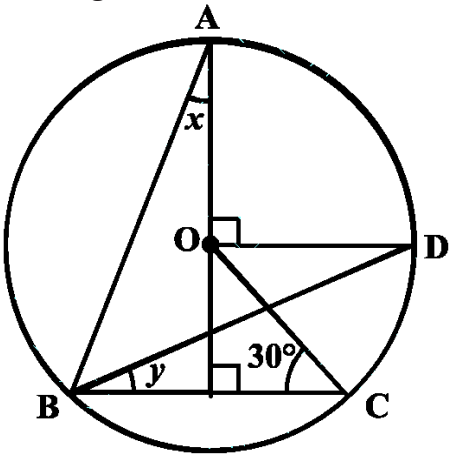
91. In the below figure, AOB is a diameter of the circle and C, D, E are any three points on the semi-circle. Find the value of ∠ACD + ∠BED.

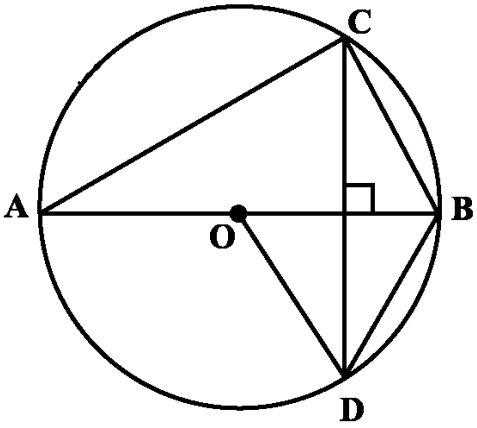




92. In the above right sided figure, ∠OAB = 30^0 and ∠OCB = 57^0. Find ∠BOC and ∠AOC.

93. In the below figure, O is the centre of the circle, ∠BCO = 30^0, find x and y.





94. In the above right sided figure, O is the centre of the circle, BD = OD and CD ⊥ AB. Find ∠CAB.

95. Let the vertex of an angle ABC be located outside a circle and let the sides of the angle intersect equal chords AD and CE with the circle. Prove that ∠ABC is equal to half the difference of the angles subtended by the chords AC and DE at the centre.

MCQ WORKSHEET-I
CLASS IX: CHAPTER – 11
CONSTRUCTIONS

1. In a pair of set, squares, one if with angles are
(a) $30^0, 60^0, 90^0$ (b) $30^0, 30^0, 45^0$ (c) $75^0, 25^0, 80^0$ (d) $65^0, 15^0, 100^0$

2. In a pair of set, squares, the other is with angles
(a) $45^0, 45^0, 90^0$ (b) $30^0, 50^0, 100^0$ (c) $60^0, 60^0, 60^0$ (d) none of these

3. To draw the perpendicular bisector of line segment AB, we open the compass
(a) more than $\frac{1}{2}$ AB (b) less than $\frac{1}{2}$ AB (c) equal to $\frac{1}{2}$ AB (d) none of these

4. To construct an angle of $22\frac{1}{2}^0$, we
(a) bisect an angle of 60^0 (b) bisect an angle of 30^0
(c) bisect an angle of 45^0 (d) none of these

5. To construct a triangle we must know at least its _____ parts.
(a) two (b) three (c) one (d) five

6. For which of the following condition the construction of a triangle is not possible:
(a) If two sides and angle included between them is not given
(b) If two sides and angle included between them is not given
(c) If its three sides are given
(d) If two angles and side included between them is given

7. Construction of a triangle is not possible if:
(a) AB + BC < AC (b) AB + BC = AC (c) both (a) and (b) (d) AB + BC > AC

8. With the help of ruler and compass it is not possible to construct an angle of
(a) 37.5^0 (b) 40.5^0 (c) 22.5^0 (d) 67.5^0

9. The construction of a triangle ABC given that BC = 3 cm, $\angle C = 60^0$ is possible when difference of AB and AC is equal to
(a) 3.2 cm (b) 3.1 cm (c) 3 cm (d) 2.8 cm

10. The construction of a triangle ABC, given that BC = 6cm, $\angle = 45^0$ is not possible when the difference of AB and AC is equal to
(a) 6.9 cm (b) 5.2 cm (c) 5.0 cm (d) 4.0 cm.

11. Construction of a triangle is not possible if:
(a) AB – BC < AC (b) AB – BC = AC (c) both (a) and (b) (d) AB – BC > AC

12. To construct an angle of 15^0, we
(a) bisect an angle of 60^0 (b) bisect an angle of 30^0
(c) bisect an angle of 45^0 (d) none of these

PRACTICE QUESTIONS
CLASS IX: CHAPTER – 11
CONSTRUCTIONS

1. Construct the following angles with the help of ruler and compass, if possible – 35^0, 40^0, 57^0, 75^0, 15^0, 135^0.

2. Draw a ΔABC, in which AB = 4cm, $\angle A = 60^0$ and BC – AC = 115 cm.

3. Draw a ΔABC, in which BC = 5cm, $\angle B = 60^0$ and AC + AB = 7.5 cm.

4. Draw a equilateral triangle whose altitude is 6 cm.

5. Draw a triangle ABC whose perimeter is 10.4 cm and the base angle are 45^0 and 60^0.

6. Construct a triangle ABC, in which $\angle B = 60°$, $\angle C = 45°$ and AB + BC + CA = 11 cm.

7. Construct a triangle ABC in which BC = 7cm, $\angle B = 75°$ and AB + AC = 13 cm.

8. Construct a triangle ABC in which BC = 8cm, $\angle B = 45°$ and AB – AC = 3.5 cm.

9. Construct a triangle PQR in which QR = 6cm, $\angle Q = 60°$ and PR – PQ = 2cm.

10. Construct a triangle XYZ in which $\angle Y = 30°$, $\angle Z = 90°$ and XY + YZ + ZX = 11 cm.

11. Construct a right triangle whose base is 12cm and sum of its hypotenuse and other side is 18 cm.

12. Construct a triangle ABC in which BC = 3cm, $\angle B = 30°$ and AB + AC = 5.2 cm.

13. Construct a triangle ABC in which BC = 6cm, $\angle B = 60°$ and the sum of other two sides is 9cm.

14. Construct a triangle ABC in which BC = 5.6cm, $\angle B = 30°$ and the difference between the other two sides is 3 cm.

15. Construct a triangle ABC whose perimeter is 14 cm and the sides are in ratio 2 : 3 : 4.

16. Construct a triangle ABC in which BC = 7.5 cm, $\angle B = 45°$ and AB – AC = 4 cm.

17. Construct a square of side 3 cm.

18. Construct a rectangle whose adjacent sides are of lengths 5 cm and 3.5 cm.

19. Construct a rhombus whose side is of length 3.4 cm and one of its angles is 45°.

20. Construct a triangle if its perimeter is 10.4 cm and two angles are 45° and 120°.

21. Construct a triangle PQR given that QR = 3cm, $\angle PQR = 45°$ and QP – PR = 2 cm.

22. Construct a right triangle when one side is 3.5 cm and sum of other sides and the hypotenuse is 5.5 cm.

23. Construct an equilateral triangle if its altitude is 3.2 cm.

24. Construct a rhombus whose diagonals are 4 cm and 6 cm in lengths.

MCQ WORKSHEET-I
CLASS IX: CHAPTER – 13
SURFACE AREAS AND VOLUMES

1. The surface area of a cuboid is
(a) 2(lb + bh + lh) (b) 3(lb + bh + lh) (c) 2(lb – bh – lh) (d) 3(lb – bh – lh)

2. The surface area of a cube if edge 'a' is
(a) $7a^2$ (b) $6a^2$ (c) $5a^3$ (d) $5a^2$

3. The length, breadth and height of a room is 5m, 4m and 3m. The cost of white washing its four walls at the rate of Rs. 7.50 per m^2 is
(a) Rs. 110 (b) Rs. 109 (c) Rs. 220 (d) Rs. 105

4. The perimeter of floor of rectangular hall is 250m. The cost of the white washing its four walls is Rs. 15000. The height of the room is
(a) 5m (b) 4m (c) 6m (d) 8m

5. The breadth of a room is twice its height and is half of its length. The volume of room is $512dm^3$. Its dimensions are
(a) 16 dm, 8 dm, 4 dm (b) 12 dm, 8 dm, 2 dm
(c) 8 dm, 4 dm, 2 dm (d) 10 dm, 15 dm, 20 dm

6. The area of three adjacent faces of a cube is x, y and z. Its volume V is
(a) V = xyz (b) $V^3 = xyz$ (c) $V^2 = xyz$ (d) none of these

7. Two cubes each of edge 12 cm are joined. The surface area of new cuboid is
(a) 140 cm^2 (b) 1440 cm^2 (c) 144 cm^2 (d) 72 cm^2

8. The curved surface area of cylinder of height 'h' and base radius 'r' is
(a) $2\pi rh$ (b) πrh (c) $\frac{1}{2}\pi rh$ (d) none of these

9. The total surface area of cylinder of base radius 'r' and height 'h' is
(a) $2\pi(r + h)$ (b) $2\pi r(r + h)$ (c) $3\pi r(r + h)$ (d) $4\pi r(r + h)$

10. The curved surface area of a cylinder of height 14 cm is 88 cm^2. The diameter of its circular base is
(a) 5cm (b) 4cm (c) 3cm (d) 2cm

11. It is required to make a closed cylindrical tank of height 1 m and base diameter 140cm from a metal sheet. How many square meters a sheet are required for the same?
(a) $6.45m^2$ (b) $6.48m^2$ (c) $7.48m^2$ (d) $5.48m^2$.

12. A metal pipe is 77 cm long. Inner diameter of cross section is 4 cm and outer diameter is 4.4 cm. Its inner curved surface area is:
(a) 864 cm^2 (b) 968 cm^2 (c) 768 cm^2 (d) none of these

MCQ WORKSHEET-II
CLASS IX: CHAPTER – 13
SURFACE AREAS AND VOLUMES

1. The diameter of a roller is 84 cm and its length is 120 cm. It takes 500 complete revolutions to move once over to level a playground. The area of the playground in m^2 is:
(a) 1584 (b) 1284 (c) 1384 (d) 1184

2. A cylindrical pillar is 50 cm in diameter and 3.5 m in height. The cost of painting its curved surface at the rate of Rs. 12.50 per m^2 is:
(a) Rs. 68.75 (b) Rs. 58.75 (c) Rs. 48.75 (d) Rs. 38.75

3. The inner diameter of circular well is 3.5m. It is 10m deep. Its inner curved surface area in m^2 is:
(a) 120 (b) 110 (c) 130 (d) 140

4. In a hot water heating system there is a cylindrical pipe of length 28 m and diameter 5 cm. The total radiating surface area in the system in m^2 is:
(a) 6.6 (b) 5.5 (c) 4.4 (d) 3.4

5. The curved surface area of a right circular cone of slant height 10 cm and base radius 7 cm is
(a) 120 cm^2 (b) 220 cm^2 (c) 240 cm^2 (d) 140 cm^2

6. The height of a cone is 16 cm and base radius is 12 cm. Its slant height is
(a) 10 cm (b) 15 cm (c) 20 cm (d) 8 cm

7. The curved surface area of a right circular cone of height 16 cm and base radius 12 cm is
(a) 753.6 cm^2 (b) 1205.76 cm^2 (c) 863.8 cm^2 (d) 907.6 cm^2

8. The curved surface area of a right circular cone of slant height 10 cm and base radius 10.5 cm is
(a) 185 cm^2 (b) 160 cm^2 (c) 165 cm^2 (d) 195 cm^2

9. The slant height of a cone is 26 cm and base diameter is 20 cm. Its height is
(a) 24 cm (b) 25 cm (c) 23 cm (d) 35 cm

10. The curved surface area of a cone is 308 cm^2 and its slant height is 14 cm. The radius of its base is
(a) 8 cm (b) 7 cm (c) 9 cm (d) 12 cm

11. A conical tent is 10 m high and the radius of its base is 24 m. The slant height of tent is
(a) 26 m (b) 28 m (c) 25 m (d) 27 m

12. The slant height and base diameter of a conical tomb are 25 m and 14 m respectively. The cost of white washing its curved surface at the rate of Rs. 210 per 100 m^2 is
(a) Rs. 1233 (b) Rs. 1155 (c) Rs. 1388 (d) Rs. 1432

MCQ WORKSHEET-III
CLASS IX: CHAPTER – 13
SURFACE AREAS AND VOLUMES

1. A joker's cap is in the form of cone of base radius 7 cm and height 24 cm. The area of sheet to make 10 such caps is
(a) 5500 cm^2 (b) 6500 cm^2 (c) 8500 cm^2 (d) 3500 cm^2

2. The curved surface area of a hemisphere of radius 'r' is
(a) $2\pi r^2$ (b) $4\pi r^2$ (c) $3\pi r^2$ (d) $5\pi r^2$

3. The total surface area of a hemisphere of radius 'r' is
(a) $2\pi r^2$ (b) $4\pi r^2$ (c) $3\pi r^2$ (d) $5\pi r^2$

4. The curved surface area of a sphere of radius 7 cm is:
(a) 516 cm^2 (b) 616 cm^2 (c) 716 cm^2 (d) 880 cm^2

5. The curved surface area of a hemisphere of radius 21 cm is:
(a) 2772 cm^2 (b) 2564 cm^2 (c) 3772 cm^2 (d) 4772 cm^2

6. The curved surface area of a sphere of radius 14 cm is:
(a) 2464 cm^2 (b) 2428 cm^2 (c) 2464 cm^2 (d) none of these.

7. The curved surface area of a sphere of diameter 14 cm is:
(a) 516 cm^2 (b) 616 cm^2 (c) 716 cm^2 (d) 880 cm^2

8. Total surface area of hemisphere of radius 10 cm is
(a) 942 cm^2 (b) 940 cm^2 (c) 842 cm^2 (d) 840 cm^2

9. The radius of a spherical balloon increases from 7 cm to 14 cm s air is being pumped into it. The ratio of surface area of the balloon in the two cases is:
(a) 4 : 1 (b) 1 : 4 (c) 3 : 1 (d) 1 : 3

10. A matchbox measures 4 cm x 2.5 cm x 1.5 cm. The volume of packet containing 12 such boxes is:
(a) 160 cm^3 (b) 180 cm^3 (c) 160 cm^2 (d) 180 cm^2

11. A cuboidal water tank is 6 m long, 5 m wide and 4.5 m deep. How many litre of water can it hold?
(a) 1350 liters (b) 13500 liters (c) 135000 liters (d) 135 liters

12. A cuboidal vessel is 10 m long and 8 m wide. How high must it be made to hold 380 cubic metres of a liquid?
(a) 4.75 m (b) 7.85 m (c) 4.75 cm (d) none of these

13. The capacity of a cuboidal tank is 50000 litres. The length and depth are respectively 2.5 m and 10 m. Its breadth is
(a) 4 m (b) 3 m (c) 2 m (d) 5 m

14. A godown measures 40 m × 25 m × 10 m. Find the maximum number of wooden crates each measuring 1.5 m × 1.25 m × 0.5 m that can be stored in the godown.
(a) 18000 (b) 16000 (c) 15000 (d) 14000

MCQ WORKSHEET-IV
CLASS IX: CHAPTER – 13
SURFACE AREAS AND VOLUMES

1. A river 3 m deep and 40 m wide is flowing at the rate of 2 km per hour. How much water will fall into the sea in a minute?
(a) 4000 m^3 (b) 40 m^3 (c) 400 m^3 (d) 40000 m^3

2. The circumference of the base of a cylindrical vessel is 132 cm and its height is 25 cm. How many litres of water can it hold?
(a) 33.75 litre (b) 34.65 litre (c) 35.75 litre (d) 38.75 litre

3. If the lateral surface of a cylinder is 94.2 cm^2 and its height is 5 cm, then find radius of its base
(a) 5cm (b) 4cm (c) 3cm (d) 6cm

4. It costs Rs 2200 to paint the inner curved surface of a cylindrical vessel 10 m deep. If the cost of painting is at the rate of Rs 20 per m^2, find radius of the base,
(a) 1.75 m (b) 1.85 m (c) 1.95 m (d) 1.65 m

5. The height and the slant height of a cone are 21 cm and 28 cm respectively. Find the volume of the cone.
(a) 5546 cm^3 (b) 7546 cm^3 (c) 5564 m^3 (d) 8546 cm^3

6. Find the volume of the right circular cone with radius 6 cm, height 7 cm
(a) 254 cm^3 (b) 264 cm^3 (c) 274 cm^2 (d) 284 cm^3

7. The radius and height of a conical vessel are 7 cm and 25 cm respectively. Its capacity in litres is
(a) 1.232 litre (b) 1.5 litre (c) 1.35 litre (d) 1.6 litre

8. The height of a cone is 15 cm. If its volume is 1570 cm^3, find the radius of the base.
(a) 12 cm (b) 10 cm (c) 15 cm (d) 18 cm

9. If the volume of a right circular cone of height 9 cm is 48π cm^3, find the diameter of its base.
(a) 12 cm (b) 10 cm (c) 6 cm (d) 8 cm

10. A conical pit of top diameter 3.5 m is 12 m deep. What is its capacity in kilolitres?
(a) 38.5 kl (b) 48.5 kl (c) 39.5 kl (d) 47.5 kl

11. Find the capacity in litres of a conical vessel with radius 7 cm, slant height 25 cm
(a) 1.232 litre (b) 1.5 litre (c) 1.35 litre (d) none of these

12. The diameter of the moon is approximately one-fourth of the diameter of the earth. What fraction of the volume of the earth is the volume of the moon?
(a) $\frac{1}{64}$ (b) $\frac{1}{32}$ (c) $\frac{1}{16}$ (d) $\frac{1}{48}$

13. The dimensions of a cuboid are 50 cm x 40 cm x 10 cm. Its volume in litres is:
(a) 10 litres (b) 12 litres (c) 20 litres (d) 25 litres

14. The volume of a cuboidal tank is 250 m^3. If its base area is 50 m^2 then depth of the tank is
(a) 5 m (b) 200 m (c) 300 m (d) 12500 m

MCQ WORKSHEET-V
CLASS IX: CHAPTER – 13
SURFACE AREAS AND VOLUMES

1. The length, breadth and height of a cuboidal solid is 4 cm, 3 cm and 2 cm respectively. Its volume is
(a) (4 + 3 +2) cm^3 (b) 2(4 + 3 +2) cm^3 (c) (4 x 3 x 2) cm^3 (d) 2(4 + 3) x 2 cm^3

2. The volume of a cuboidal solid of length 8 m and breadth 5 m is 200 m^3. Find its height.
(a) 5 m (b) 6 m (c) 15 m (d) 18 m

3. The curved surface area of a sphere is 616 cm^2. Its radius is
(a) 7 cm (b) 5 cm (c) 6 cm (d) 8 cm

4. If radius of a sphere is $\frac{2d}{3}$ then its volume is
(a) $\frac{32}{81}\pi d^3$ (b) $\frac{23}{4}\pi d^3$ (c) $\frac{32}{3}\pi d^3$ (d) $\frac{34}{3}\pi d^3$

5. The capacity of a cylindrical tank is 6160 cm^3. Its base diameter is 28 m. The depth of this tank is
(a) 5 m (b) 10 m (c) 15 m (d) 8 m

6. The volume of a cylinder of radius r and length h is:
(a) $2\pi rh$ (b) $\frac{4}{3}\pi r^2 h$ (c) $\pi r^2 h$ (d) $2\pi r^2 h$

7. Base radius of two cylinder are in the ratio 2 : 3 and their heights are in the ratio 5 : 3. The ratio of their volumes is
(a) 27 : 20 (b) 25 : 24 (c) 20 : 27 (d) 15 : 20

8. If base radius and height of a cylinder are increased by 100% then its volume increased by:
(a) 30% (b) 40% (c) 42% (d) 33.1%

9. The diameter of a sphere is 14 m. The volume of this sphere is
(a) $1437\frac{1}{3}$ m^3 (b) $1357\frac{1}{3}$ m^3 (c) $1437\frac{2}{3}$ m^3 (d) $1337\frac{2}{3}$ m^3

10. The volume of a sphere is 524 cm^3. The diameter of sphere is
(a) 5cm (b) 4cm (c) 3cm (d) 7cm

11. The total surface area of a cylinder is 40π cm^2. If height is 5.5 cm then its base radius is
(a) 5cm (b) 2.5cm (c) 1.5cm (d) 10cm

12. The area of circular base of a right circular cone is 78.5 cm^2. If its height is 12 cm then its volume is
(a) 31.4 cm^3 (b) 3.14 cm^3 (c) 314 cm^3 (d) none of these

13. The base radius of a cone is 11.3 cm and curved surface area is 355 cm^2. Its height is (Take $\pi = \frac{355}{113}$)
(a) 5 cm (b) 10 cm (c) 11 cm (d) 9 cm

MCQ WORKSHEET-VI
CLASS IX: CHAPTER – 13
SURFACE AREAS AND VOLUMES

1. If the dimensions of a cuboid are 3 cm, 4 cm and 10 cm, then its surface area is

A. 82 cm^2 B. 123 cm^2 C. 164 cm^2 D. 216 cm^2

2. The volume of the cuboid in Q.1 is

A. 17 cm^3 B. 164 cm^3 C. 120 cm^3 D. 240 cm^3

3. The surface area of a cuboid is 1372 sq. cm. If its dimensions are in the ratio of 4 : 2 : 1, then its length is

A. 7 cm B. 14 cm C. 21 cm D. 28cm

4. The base radius and height of a right circular cylinder are 7 cm and 13.5 cm. The volume of cylinder is

A. 1579 cm^3 B. 1897 cm^3 C. 2079 cm^3 D. 2197 cm^3

5. The base radius of a cone is 5 cm and its height is 12 cm. Its slant height is

A. 13 cm B. 19.5 cm C. 26 cm D. 52cm

6. The curved surface area of a cylinder of height 14 cm is 88 sq. cm. The diameter of the cylinder is

A. 0.5 cm B. 1.0 cm C. 1.5 cm D. 2.0 cm

7. The lateral surface area of a right circular cone of height 28 cm and base radius 21 cm is

A. 1155 cm^2 B. 1055 cm^2 C. 2110 cm^2 D. 2310 cm^2

8. The circumference of the base of a 8 m high conical tent is $\frac{264}{7}$ m^2. The area of canvas required to make the tent is

A. $\frac{1360}{7}$ cm^2 B. $\frac{1360}{14}$ cm^2 C. 286 cm^2 D. 98 cm^2

9. The area of metal sheet required to make a closed hollow cone of height 24 m and base radius 7 m is

A. 176 m^2 B. 352 m^2 C. 704 m^2 D. 1408 m^2

10. The diameter of a sphere whose surface area is 346.5 cm^2 is

A. 5.25 cm B. 5.75 cm C. 11.5 cm D. 10.5 cm

11. The radius of a spherical baloon increases from 7 cm to 14 cm when air is pumped into it. The ratio of the surface area of original baloon to inflated one is

A. 1 : 2 B. 1 : 3 C. 1 : 4 D. 4 : 3

12. The circumference of the base of a cylinderical vessel is 132 cm and its height is 25 cm. If 1000 cu.cm = 1 liter, the number of litres, of water the vessel can hold is

A. 17.325 B. 34.65 C. 34.5 D. 69.30

13. The number of litres of milk a hemispherical bowl of radius 10.5 cm can hold is

A. 2.47 B. 2.476 C. 2.376 D. 3.476

14. The number of bricks, each measuring 18 cm × 12 cm × 10 cm are required to build a 1 wall 12 m × 0.6 m × 4.5 m if $\frac{1}{10}$ of its volume is taken by mortar, is

A. 15000 B. 13500 C. 12500 D. 13900

15. The radius of a sphere is 10 cm. If its radius is increased by 1 cm, the volume of the sphere is increased by

A. 13.3% B. 21.1% C. 30% D. 33.1%

PRACTICE QUESTIONS
CLASS IX: CHAPTER – 13
SURFACE AREAS AND VOLUMES

11. The dimensions of a prayer Hall are 20m x 15m x 8m. Find the cost of painting its walls at Rs. 10 per m^2.

12. Find the curved surface area of a right circular cylinder whose height is 13.5 cm and radius of tis base is 7 cm. Find also its surface area.

13. The exterior diameter of an iron pipe is 25cm and it is one cm thick. Find the whole surface are of the pipe it is 21cm long.

14. A roller 150 cm long has a diameter of 70 cm. To level a playground it takes 750 complete revolutions. Determine the cost of leveling the playground at the rate of 75 paise per m^2.

15. Find the total surface area of a cone, if its slant height is 21 cm and the diameter of its base is 24 cm.

16. The volume of a sphere is 4851 cm^3. How much should its radius be reduced so that it volume becomes $\frac{4312}{3}$ cm^3.

17. A river, 3 m deep and 40m wide, is flowing at the rate of 2km/hr. How much water will fall into the sea in a minute?

18. Find the capacity in litres of a conical vessel whose diameter is 14 cm and slant height is 25 cm.

19. What is the total surface area of a hemisphere of base radius 7cm?

20. A village having a population of 4000, requires 150 litres of water per head per day. It has a tank measuring 20m x 15m x 6m. For how many days, the water of the tank will be sufficient for the village?

21. Mary wants to decorate her Christmas tree. She wants to place the tree on a wooden box covered with coloured paper with picture of Santa Claus on it. She must know the exact quantity of paper to buy for this purpose. If the box has length, breadth and height as 80 cm, 40 cm and 20 cm respectively how many square sheets of paper of side 40 cm would she require?

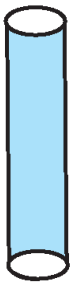
22. Hameed has built a cubical water tank with lid for his house, with each outer edge 1.5 m long. He gets the outer surface of the tank excluding the base, covered with square tiles of side 25 cm. Find how much he would spend for the tiles, if the cost of the tiles is Rs 360 per dozen.

23. A small indoor greenhouse (herbarium) is made entirely of glass panes (including base) held together with tape. It is 30 cm long, 25 cm wide and 25 cm high. (i) What is the area of the glass? (ii) How much of tape is needed for all the 12 edges?

24. Shanti Sweets Stall was placing an order for making cardboard boxes for packing their sweets. Two sizes of boxes were required. The bigger of dimensions 25 cm × 20 cm × 5 cm and the smaller of dimensions 15 cm × 12 cm × 5 cm. For all the overlaps, 5% of the total surface area is required extra. If the cost of the cardboard is Rs 4 for 1000 cm2, find the cost of cardboard required for supplying 250 boxes of each kind.

25. Parveen wanted to make a temporary shelter for her car, by making a box like structure with tarpaulin that covers all the four sides and the top of the car (with the front face as a flap which can be rolled up). Assuming that the stitching margins are very small, and therefore negligible, how much tarpaulin would be required to make the shelter of height 2.5 m, with base dimensions 4 m × 3 m?

26. Savitri had to make a model of a cylindrical kaleidoscope for her science project. She wanted to use chart paper to make the curved surface of the kaleidoscope. What would be the area of chart paper required by her, if she wanted to make a kaleidoscope of length 25 cm with a 3.5 cm radius?



27. A metal pipe is 77 cm long. The inner diameter of a cross section is 4 cm, the outer diameter being 4.4 cm. Find its

(i) inner curved surface area,
(ii) outer curved surface area,
(iii) total surface area.

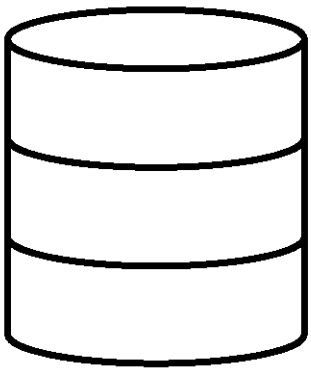
28. Find (i) the lateral or curved surface area of a closed cylindrical petrol storage tank that is 4.2 m in diameter and 4.5 m high. (ii) how much steel was actually used, if $\frac{1}{12}$ of the steel actually used was wasted in making the tank.

29. Find the curved surface area of a right circular cone whose slant height is 10 cm and base radius is 7 cm.

30. The height of a cone is 16 cm and its base radius is 12 cm. Find the curved surface area and the total surface area of the cone (Use $\pi = 3.14$).

31. A corn cob shaped somewhat like a cone, has the radius of its broadest end as 2.1 cm and length (height) as 20 cm. If each 1 cm^2 of the surface of the cob carries an average of four grains, find how many grains you would find on the entire cob.

32. In the adjoining figure you see the frame of a lampshade. It is to be covered with a decorative cloth. The frame has a base diameter of 20 cm and height of 30 cm. A margin of 2.5 cm is to be given for folding it over the top and bottom of the frame. Find how much cloth is required for covering the lampshade.



33. A conical tent is 10 m high and the radius of its base is 24 m. Find (i) slant height of the tent. (ii) cost of the canvas required to make the tent, if the cost of 1 m2 canvas is Rs 70.

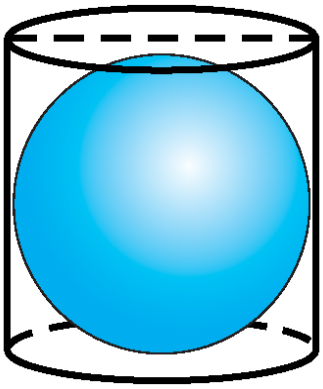
34. What length of tarpaulin 3 m wide will be required to make conical tent of height 8 m and base radius 6 m? Assume that the extra length of material that will be required for stitching margins and wastage in cutting is approximately 20 cm (Use $\pi = 3.14$).

35. The slant height and base diameter of a conical tomb are 25 m and 14 m respectively. Find the cost of white-washing its curved surface at the rate of Rs 210 per 100 m^2.

36. A joker's cap is in the form of a right circular cone of base radius 7 cm and height 24 cm. Find the area of the sheet required to make 10 such caps.

37. A hemispherical dome of a building needs to be painted. If the circumference of the base of the dome is 17.6 m, find the cost of painting it, given the cost of painting is Rs 5 per 100 cm^2.

38. A right circular cylinder just encloses a sphere of radius *r*. Find (i) surface area of the sphere, (ii) curved surface area of the cylinder, (iii) ratio of the areas obtained in (i) and (ii).



39. A hemispherical bowl is made of steel, 0.25 cm thick. The inner radius of the bowl is 5 cm. Find the outer curved surface area of the bowl.

40. A wall of length 10 m was to be built across an open ground. The height of the wall is 4 m and thickness of the wall is 24 cm. If this wall is to be built up with bricks whose dimensions are 24 cm × 12 cm × 8 cm, how many bricks would be required?

41. A village, having a population of 4000, requires 150 litres of water per head per day. It has a tank measuring 20 m × 15 m × 6 m. For how many days will the water of this tank last?

42. A godown measures 40 m × 25 m × 10 m. Find the maximum number of wooden crates each measuring 1.5 m × 1.25 m × 0.5 m that can be stored in the godown.

43. A solid cube of side 12 cm is cut into eight cubes of equal volume. What will be the side of the new cube? Also, find the ratio between their surface areas.

44. A river 3 m deep and 40 m wide is flowing at the rate of 2 km per hour. How much water will fall into the sea in a minute?

45. The capacity of a closed cylindrical vessel of height 1 m is 15.4 litres. How many square metres of metal sheet would be needed to make it?

46. A lead pencil consists of a cylinder of wood with a solid cylinder of graphite filled in the interior. The diameter of the pencil is 7 mm and the diameter of the graphite is 1 mm. If the length of the pencil is 14 cm, find the volume of the wood and that of the graphite.

47. The pillars of a temple are cylindrically shaped. If each pillar has a circular base of radius 20 cm and height 10 m, how much concrete mixture would be required to build 14 such

48. Monica has a piece of canvas whose area is 551 m-. She uses it to have a conical tent made, with a base radius of 7 m. Assuming that all the stitching margins and the wastage incurred while cutting, amounts to approximately 1 m^2, find the volume of the tent that can be made with it.

49. A right triangle ABC with sides 5 cm, 12 cm and 13 cm is revolved about the side 12 cm. Find the volume of the solid so obtained.

50. A heap of wheat is in the form of a cone whose diameter is 10.5 m and height is 3 m. Find its volume. The heap is to be covered by canvas to protect it from rain. Find the area of the canvas required.

51. A dome of a building is in the form of a hemisphere. From inside, it was white-washed at the cost of Rs 498.96. If the cost of white-washing is Rs 2.00 per square metre, find the (i) inside surface area of the dome, (ii) volume of the air inside the dome.

52. Twenty seven solid iron spheres, each of radius *r* and surface area S are melted to form a sphere with surface area S'. Find the (i) radius *r'* of the new sphere, (ii) ratio of S and S'.

53. A capsule of medicine is in the shape of a sphere of diameter 3.5 mm. How much medicine (in mm3) is needed to fill this capsule?

54. The surface area of a sphere of radius 5 cm is five times the area of the curved surface of a cone of radius 4 cm. Find the height and the volume of the cone (taking $\pi = \frac{22}{7}$)

55. The radius of a sphere is increased by 10%. Prove that the volume will be increased by 33.1% approximately.

56. Metal spheres, each of radius 2 cm, are packed into a rectangular box of internal dimensions 16 cm × 8 cm × 8 cm. When 16 spheres are packed the box is filled with preservative liquid. Find the volume of this liquid. Give your answer to the nearest integer. [Use $\pi = 3.14$]

57. A storage tank is in the form of a cube. When it is full of water, the volume of water is 15.625 m^3. If the present depth of water is 1.3 m, find the volume of water already used from the tank.

58. Find the amount of water displaced by a solid spherical ball of diameter 4.2 cm, when it is completely immersed in water.

59. How many square metres of canvas is required for a conical tent whose height is 3.5 m and the radius of the base is 12 m?

60. Two solid spheres made of the same metal have weights 5920 g and 740 g, respectively. Determine the radius of the larger sphere, if the diameter of the smaller one is 5 cm.

61. A school provides milk to the students daily in a cylindrical glasses of diameter 7 cm. If the glass is filled with milk upto an height of 12 cm, find how many litres of milk is needed to serve 1600 students.

62. A cylindrical roller 2.5 m in length, 1.75 m in radius when rolled on a road was found to cover the area of 5500 m2. How many revolutions did it make?

63. A small village, having a population of 5000, requires 75 litres of water per head per day. The village has got an overhead tank of measurement 40 m × 25 m × 15 m. For how many days will the water of this tank last?

64. A shopkeeper has one spherical laddoo of radius 5cm. With the same amount of material, how many laddoos of radius 2.5 cm can be made?

65. A right triangle with sides 6 cm, 8 cm and 10 cm is revolved about the side 8 cm. Find the volume and the curved surface of the solid so formed.

66. Rain water which falls on a flat rectangular surface of length 6 m and breadth 4 m is transferred into a cylindrical vessel of internal radius 20 cm. What will be the height of water in the cylindrical vessel if the rain fall is 1 cm. Give your answer to the nearest integer. (Take $\pi = 3.14$)

67. A cylindrical tube opened at both the ends is made of iron sheet which is 2 cm thick. If the outer diameter is 16 cm and its length is 100 cm, find how many cubic centimeters of iron has been used in making the tube ?

68. A semi-circular sheet of metal of diameter 28cm is bent to form an open conical cup. Find the capacity of the cup.

69. A cloth having an area of 165 m2 is shaped into the form of a conical tent of radius 5 m

(i) How many students can sit in the tent if a student, on an average, occupies $\frac{5}{7}$ m^2 on the ground?

(ii) Find the volume of the cone.

70. The water for a factory is stored in a hemispherical tank whose internal diameter is 14 m. The tank contains 50 kilolitres of water. Water is pumped into the tank to fill to its capacity. Calculate the volume of water pumped into the tank.

71. The volumes of the two spheres are in the ratio 64 : 27. Find the ratio of their surface areas.

72. A cube of side 4 cm contains a sphere touching its sides. Find the volume of the gap in between.

73. A sphere and a right circular cylinder of the same radius have equal volumes. By what percentage does the diameter of the cylinder exceed its height ?

74. 30 circular plates, each of radius 14 cm and thickness 3cm are placed one above the another to form a cylindrical solid. Find : (i) the total surface area (ii) volume of the cylinder so formed.

75. A hemispherical tank is made up of an iron sheet 1 cm thick. If the inner radius is 1 m, then find the volume of the iron used to make the tank.

MCQ WORKSHEET-I
CLASS IX: CHAPTER - 15
PROBABILITY

1. There are 6 marbles in a box with number 1 to6 marked on each of them . What is the probability of drawing a marble with number 2 ?

(a) $\frac{1}{6}$ (b) $\frac{1}{5}$ (c) $\frac{1}{3}$ (d) 1

2. A coin is flipped to decide which team starts the game . What is the probability of your team will start ?

(a) $\frac{1}{4}$ (b) $\frac{1}{2}$ (c) 1 (d) 0

3. A die is thrown once . What will be the probability of getting a prime number ?

(a) $\frac{1}{6}$ (b) $\frac{1}{2}$ (c) 1 (d) 0

Cards are marked with numbers 1 to 25 are placed in the box and mixed thoroughly. One card is drawn at random from the box. Answer the following questions (Q4-Q13)

4. What is the probability of getting a number 5?

(a) 1 (b) 0 (c) $\frac{1}{25}$ (d) $\frac{1}{5}$

5. What is the probability of getting a number less than 11?

(a) 1 (b) 0 (c) $\frac{1}{5}$ (d) $\frac{2}{5}$

6. What is the probability of getting a number greater than 25?

(a) 1 (b) 0 (c) $\frac{1}{5}$ (d) $\frac{2}{5}$

7. What is the probability of getting a multiple of 5?

(a) 1 (b) 0 (c) $\frac{1}{25}$ (d) $\frac{1}{5}$

8. What is the probability of getting an even number?

(a) 1 (b) 0 (c) $\frac{12}{25}$ (d) $\frac{13}{25}$

9. What is the probability of getting an odd number?

(a) 1 (b) 0 (c) $\frac{12}{25}$ (d) $\frac{13}{25}$

10. What is the probability of getting a prime number?

(a) $\frac{8}{25}$ (b) $\frac{9}{25}$ (c) $\frac{12}{25}$ (d) $\frac{13}{25}$

11. What is the probability of getting a number divisible by 3?

(a) $\frac{8}{25}$ (b) $\frac{9}{25}$ (c) $\frac{12}{25}$ (d) $\frac{13}{25}$

12. What is the probability of getting a number divisible by 4?

(a) $\frac{8}{25}$ (b) $\frac{9}{25}$ (c) $\frac{6}{25}$ (d) $\frac{3}{25}$

13. What is the probability of getting a number divisible by 7?

(a) $\frac{8}{25}$ (b) $\frac{9}{25}$ (c) $\frac{6}{25}$ (d) $\frac{3}{25}$

14. A bag has 4 red balls and 2 yellow balls. A ball is drawn from the bag without looking into the bag. What is probability of getting a red ball?

(a) $\frac{1}{6}$ (b) $\frac{2}{3}$ (c) $\frac{1}{3}$ (d) 1

15. A bag has 4 red balls and 2 yellow balls. A ball is drawn from the bag without looking into the bag. What is probability of getting a yellow ball?

(a) $\frac{1}{6}$ (b) $\frac{2}{3}$ (c) $\frac{1}{3}$ (d) 1

MCQ WORKSHEET-II
CLASS IX: CHAPTER - 15
PROBABILITY

A box contains 3 blue, 2 white, and 5 red marbles. If a marble is drawn at *random* from the box, then answer the questions from 1 to 5.

1. What is the probability that the marble will be white?

(a) $\frac{1}{6}$ (b) $\frac{1}{5}$ (c) $\frac{1}{3}$ (d) 1

2. What is the probability that the marble will be red?

(a) $\frac{1}{6}$ (b) $\frac{1}{2}$ (c) 1 (d) 0

3. What is the probability that the marble will be blue?

(a) $\frac{3}{10}$ (b) $\frac{1}{2}$ (c) 1 (d) 0

4. What is the probability that the marble will be any one colour?

(a) $\frac{1}{6}$ (b) $\frac{1}{2}$ (c) 1 (d) 0

5. What is the probability that the marble will be red or blue?

(a) 1 (b) $\frac{4}{5}$ (c) $\frac{1}{5}$ (d) $\frac{2}{5}$

A die is thrown once, then answer the questions from 6 to 10.

6. Find the probability of getting a prime number

(a) $\frac{1}{6}$ (b) $\frac{1}{2}$ (c) 1 (d) 0

7. Find the probability of getting a number lying between 2 and 6

(a) $\frac{1}{6}$ (b) $\frac{1}{2}$ (c) 1 (d) 0

8. Find the probability of getting an odd number.

(a) $\frac{1}{6}$ (b) $\frac{1}{2}$ (c) 1 (d) 0

9. Find the probability of getting an even number.

(a) $\frac{1}{6}$ (b) $\frac{1}{2}$ (c) 1 (d) 0

10. Find the probability of getting a number greater than 4.

(a) $\frac{1}{6}$ (b) $\frac{2}{3}$ (c) $\frac{1}{3}$ (d) 1

MCQ WORKSHEET-III
CLASS IX: CHAPTER - 15
PROBABILITY

A box contains 5 red marbles, 6 white marbles and 4 green marbles. If a marble is drawn at *random* from the box, then answer the questions from 1 to 6.

1. What is the probability that the marble will be white?

(a) $\frac{1}{6}$ (b) $\frac{2}{3}$ (c) $\frac{1}{3}$ (d) 1

2. What is the probability that the marble will be red?

(a) $\frac{1}{6}$ (b) $\frac{2}{3}$ (c) $\frac{1}{3}$ (d) 1

3. What is the probability that the marble will be green?

(a) 0.3 (b) $\frac{1}{2}$ (c) 1 (d) none of these

4. What is the probability that the marble will be any one colour?

(a) $\frac{1}{6}$ (b) $\frac{1}{2}$ (c) 1 (d) 0

5. What is the probability that the marble will be red or green?

(a) $\frac{2}{5}$ (b) $\frac{3}{25}$ (c) $\frac{1}{5}$ (d) none of these

6. What is the probability that the marble will be blue?

(a) $\frac{1}{6}$ (b) $\frac{1}{2}$ (c) 1 (d) 0

Cards are marked with numbers 1 to 50 are placed in the box and mixed thoroughly. One card is drawn at random from the box. Answer the following questions from 7 to 15.

7. What is the probability of getting a number 5?

(a) 1 (b) 0 (c) $\frac{1}{25}$ (d) $\frac{1}{5}$

8. What is the probability of getting a number less than 11?

(a) 1 (b) 0 (c) $\frac{1}{5}$ (d) $\frac{2}{5}$

9. What is the probability of getting a number greater than 50?

(a) 1 (b) 0 (c) $\frac{1}{5}$ (d) $\frac{2}{5}$

10. What is the probability of getting a multiple of 5?

(a) 1 (b) 0 (c) $\frac{1}{25}$ (d) $\frac{1}{5}$

11. What is the probability of getting an even number?

(a) 1 (b) $\frac{1}{2}$ (c) $\frac{12}{25}$ (d) $\frac{13}{25}$

12. What is the probability of getting an odd number?

(a) 1 (b) $\frac{1}{2}$ (c) $\frac{12}{25}$ (d) $\frac{13}{25}$

13. What is the probability of getting a prime number?

(a) 1 (b) $\frac{1}{2}$ (c) $\frac{4}{10}$ (d) $\frac{3}{10}$

14. What is the probability of getting a number divisible by 3?

(a) $\frac{8}{25}$ (b) $\frac{9}{25}$ (c) $\frac{12}{25}$ (d) $\frac{13}{25}$

15. What is the probability of getting a number divisible by 4?

(a) $\frac{8}{25}$ (b) $\frac{9}{25}$ (c) $\frac{6}{25}$ (d) $\frac{3}{25}$

16. What is the probability of getting a number divisible by 7?

(a) $\frac{8}{25}$ (b) $\frac{9}{25}$ (c) $\frac{6}{25}$ (d) $\frac{3}{25}$

MCQ WORKSHEET-IV
CLASS IX: CHAPTER - 15
PROBABILITY

1. A coin is tossed 1000 times and 560 times a "head" occurs. The empirical probability of occurrence of a Head in this case is

A. 0.5 B. 0.56 C. 0.44 D. 0.056

2. Two coins are tossed 200 times and the following out comes are recorded

HH	HT/TH	TT
56	110	34

What is the empirical probability of occurrence of at least one Head in the above case

A. 0.33 B. 0.34 C. 0.66 D. 0.83

A die is thrown 200 times and the following outcomes are noted, with their frequencies:

Outcome	1	2	3	4	5	6
Frequency	56	22	30	42	32	18

3. What is the empirical probability of getting a 1 in the above case.

A. 0.28 B. 0.22 C. 0.15 D. 0.21

4. What is the empirical probability of getting a number less than 4 ?

A. 0.50 B. 0.54 C. 0.46 D. 0.52

5. What is the empirical probability. of getting a number greater than 4.

A. 0.32 B. 0.25 C. 0.18 D. 0.30

6. On a particular day, the number of vehicles passing a crossing is given below :

Vehicle	Two wheeler	Three wheeler	Four wheeler
Frequency	52	71	77

What is the probability of a two wheeler passing the crossing on that day ?

A. 0.26 B. 0.71 C. 0.385 D. 0.615

7. The following table shows the blood-group of 100 students

Blood group	A	B	O	AB	B^+
Number of Students	12	23	35	20	10

One student is taken at random. What is probability that his blood group is B^+

A. 0.12 B. 0.35 C. 0.20 D. 0.10

8. In a bag, there are 100 bulbs out of which 30 are bad ones. A bulb is taken out of the bag at random. The probability of the selected bulb to be good is

A. 0.50 B. 0.70 C. 0.30 D. None of these

9. On a page of telephone directory having 250 telephone numbers, the Frequency of the unit digits of those number are given below :

0	1	2	3	4	5	6	7	8	9
18	22	32	28	40	30	30	22	18	10

A telephone number is selected from the page at random. What is the probability that its unit digit is

(*a*)2

A. 0.16 B. 0.128 C. 0.064 D. 0.04

(*b*) More than 6

A. 0.20 B. 0.25 C. 0.32 D. 0.16

(*c*) less than 2

A. 0.16 B. 0.18 C. 0.22 D. 0.32

10. **10 defective pens are accidentally mixed with 90 good ones. It is not possible to just look at a pen and tell whether or not it is defective. One pen is taken out at random from this lot. Determine the probability that the pen taken out is a good one.**

A. 0.10 B. 0.20 C. 0.90 D. 1.0

PRACTICE QUESTIONS
CLASS IX: CHAPTER - 15
PROBABILITY

1. Write all possible outcomes when
(i) one coin is tossed.
(ii) two coins are tossed.
(iii) one die is rolled.

2. Three coins are tossed simultaneously 100 times. The following outcomes are recorded.

Outcome	3 tails	2 tails	1 tail	No tail
Frequency	23	28	23	26

Find the probability of coming up more than one tail.

3. A die is thrown 300 times with the frequencies for the outcomes 1, 2, 3, 4, 5 and 6 as given in the following table :

Outcome	1	2	3	4	5	6
Frequency	42	60	55	53	60	30

Find the probability of getting (i) an even number (ii) a prime number and
(iii) a number more than 4.

4. A box contains 3 blue, 2 white, and 4 red marbles. If a marble is drawn at *random* from the box, what is the probability that it will be (i) white? (ii) blue? (iii) red?

5. A coin is tossed 1000 times with the following frequencies: Head : 455, Tail : 545 Compute the probability for getting head.

6. Two coins are tossed simultaneously 500 times, and we get Two heads : 105 times, One head : 275 times and No head : 120 times. Find the probability of occurrence of two heads.

7. A die is thrown 1000 times with the frequencies for the outcomes 1, 2, 3, 4, 5 and 6 as given in the following table :

Outcome	1	2	3	4	5	6
Frequency	179	150	157	149	175	190

Find the probability of getting (i) an odd number (ii) a prime number and
(iii) a number greater than 4.

8. 12 defective pens are accidentally mixed with 132 good ones. It is not possible to just look at a pen and tell whether or not it is defective. One pen is taken out at random from this lot. Determine the probability that the pen taken out is a good one.

9. On one page of a telephone directory, there were 200 telephone numbers. The frequency distribution of their unit place digit (for example, in the number 25828573, the unit place digit is 3) is given in Table 15.7 :

Digit	0	1	2	3	4	5	6	7	8	9
Frequency	22	26	22	22	20	10	14	28	16	20

Without looking at the page, the pencil is placed on one of these numbers, i.e., the number is chosen at *random*. What is the probability that the digit in its unit place is (i) an odd number (ii) a prime number and (iii) a number greater than 4.?

10. A box contains 90 discs which are numbered from 1 to 90. If one disc is drawn at random from the box, find the probability that it bears (i) a two-digit number (ii) a perfect square number (iii) a number divisible by 5.

11. A lot consists of 144 ball pens of which 20 are defective and the others are good. Nuri will buy a pen if it is good, but will not buy if it is defective. The shopkeeper draws one pen at random and gives it to her. What is the probability that (i) She will buy it ? (ii) She will not buy it ?

12. A bag contains 3 red balls and 5 black balls. A ball is drawn at random from the bag. What is the probability that the ball drawn is (i) red ? (ii) not red?

13. A box contains 5 red marbles, 8 white marbles and 4 green marbles. One marble is taken out of the box at random. What is the probability that the marble taken out will be (i) red ? (ii) white ? (iii) not green?

14. A die is thrown once. Find the probability of getting (i) a prime number; (ii) a number lying between 2 and 6; (iii) an odd number.

15. A bag contains 5 red, 8 green and 7 white balls. One ball is drawn at random from the bag, find the probability of getting (i) a white ball or a green ball and (ii) neither green ball nor red ball.

16. Harpreet tosses two different coins simultaneously. What is the probability that she gets *at least* one head?

17. A company selected 4000 households at random and surveyed them to find out a relationship between income level and the number of television sets in a home. The information so obtained is listed in the following table:

Monthly income (in Rs.)	**Number of Televisions/household**			
	0	**1**	**2**	**Above 2**
< 10000	20	80	10	0
10000 – 14999	10	240	60	0
15000 – 19999	0	380	120	30
20000 – 24999	0	520	370	80
25000 and above	0	1100	760	220

Find the probability:
(i) of a household earning Rs 10000 – Rs 14999 per year and having exactly one television.
(ii) of a household earning Rs 25000 and more per year and owning 2 televisions.
(iii) of a household not having any television.

18. Cards are marked with numbers 4, 5, 6, …….50 are placed in the box and mixed thoroughly. One card is drawn at random from the box. What is the probability of getting (i) an even prime number (ii) a number divisible by 5 and (iii) multiple of 7?

19. The record of a weather station shows that out of the past 250 consecutive days, its weather forecasts were correct 175 times. (i) What is the probability that on a given day it was correct? (ii) What is the probability that it was not correct on a given day?

20. Two dice are thrown simultaneously 500 times. Each time the sum of two numbers appearing on their tops is noted and recorded as given in the following table:

Sum	2	3	4	5	6	7	8	9	10	11	12
Frequency	14	30	42	55	72	75	70	53	46	28	15

If the dice are thrown once more, what is the probability of getting a sum (i) 3? (ii) more than 10? (iii) less than or equal to 5? (iv) between 8 and 12?

21. Bulbs are packed in cartons each containing 40 bulbs. Seven hundred cartons were examined for defective bulbs and the results are given in the following table:

Number of defective bulbs	0	1	2	3	4	5	6	More than 6
Frequency	400	180	48	41	18	8	3	2

One carton was selected at random. What is the probability that it has
(i) no defective bulb?
(ii) defective bulbs from 2 to 6?
(iii) defective bulbs less than 4?

22. Over the past 200 working days, the number of defective parts produced by a machine is given in the following table:

Number of defective parts	0	1	2	3	4	5	6	7	8	9	10	11	12	13
Days	50	32	22	18	12	12	10	10	10	8	6	6	2	2

Determine the probability that tomorrow's output will have
(i) no defective part
(ii) atleast one defective part
(iii) not more than 5 defective parts
(iv) more than 13 defective parts

23. A recent survey found that the ages of workers in a factory is distributed as follows:

Age(in years)	20 – 29	30 – 39	40 – 49	50 – 59	60 and above
Number of workers	38	27	86	46	3

If a person is selected at random, find the probability that the person is:
(i) 40 years or more
(ii) under 40 years

24. Three coins are tossed simultaneously 200 times with the following frequencies of different outcomes:

Outcomes	3 heads	2 heads	1 head	No head
Frequency	23	72	77	28

If the three coins are simultaneously tossed again, compute the probability of getting
(i) 2 heads.
(ii) at least 2 heads
(iii) at most 2 heads